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No. 3.—VETERINARY APPLICATION OF ANTIBIOTICS AND OTHER MODERN THERAPEUTIC SUBSTANCES*

BY

S. F. SCHEIDY, V.M.D.

AND

C. E. E. BUNN, D.V.M.

MEDICAL DIVISION, SHARP AND DOHME, DIVISION OF MERCK AND CO., PHILA., PA.

Dr. W. R. Wooldridge, M.SC., M.R.C.V.S., Scientific Director of the Animal Health Trust, presided over a crowded session for the consideration of the above paper at the Music Hall, Aberdeen, on the morning of Wednesday, September 9th, 1953. The Recording Secretary was Mr. G. A. M. Sharman, B.SC., M.R.C.V.S., of the North of Scotland College of Agriculture.

The CHAIRMAN: Ladies and gentlemen, we are taking Dr. Scheidy's paper as read, so I hope all of you have managed to read it already. Dr. Scheidy will make a few introductory remarks and Mr. Ogilvie will open the discussion.

We are privileged indeed to have this paper from Dr. Scheidy. He is one of our distinguished colleagues in the United States and is a member of the Council of the American Veterinary Association. As an important member of the profession in the U.S.A. he found himself in Stockholm and, like many of us in Stockholm, he did not meet all those he hoped to meet. Unfortunately, Dr. Scheidy and I did not meet while we were both there.

However, true to his countrymen's prowess, he has spent the time since Stockholm in seeing most of the countries of Europe, and so you must forgive him if he finds himself groping—I do not say he will, but he might—to get on to the subject, in view of his hurried tour of Europe and his busy visit over here.

I think we can rely upon having a most stimulating opening because Dr. Scheidy is speaking from first-hand knowledge. He is director of the Veterinary Medical Research Division of Sharp and Dohme, which as you know is now part of the Merck organisation in the U.S.A. I do not wish to detain you any more except to remind you that this is the type of subject which is very wide, though despite its width Dr. Scheidy is prepared to go still further if some of you wish to make enquiries about practice in the United States. I hope, however, that most of your questions at the end will be related particularly to the paper. Dr. Scheidy. (Applause.)

Dr. SCHEIDY: Mr. Chairman and ladies and gentlemen, I wish to express my sincere appreciation for the opportunity and the courtesies you have extended to me. Yesterday we arrived in Aberdeen by air to find two of your gentlemen at the airport who transported us to the hotel. Upon arriving at the hotel I was greeted with words that made me feel very good: " Hi! Sam! " It was Dr. Greig and Colonel Hale, one of my college mates. Thus, as soon as we arrived in Aberdeen we felt at home.

Immediately after the conclusion of our American Veterinary Medical Association meeting on July 23rd, a group of approximately 70 people departed for Montreal. We sailed from Montreal for Liverpool and had a very delightful voyage. Most of the people in the group were veterinarians and their wives on their way to Stockholm. We arrived in Liverpool and from there proceeded to Edinburgh. On the first day in Edinburgh we visited the Moredun Institute, the Royal (Dick) School of Veterinary Studies, and we were very royally entertained by Drs. Mitchell and Greig. Their courtesies will never be forgotten by the group that was privileged to attend those get-togethers.

After the short visit to Edinburgh we subsequently departed for Norway, and thence to Sweden. We attended the 15th International Veterinary Congress, and for most of us it was the first. We met many colleagues from about 50 other nations that were represented there and we considered it a real privilege.

Following the Congress at Stockholm we visited Denmark, Holland and Belgium. We had also a short stay in Germany, and a very delightful time in Switzerland and the Swiss Alps. Then on to France, and finally, last Saturday, to London.

We were very happy to reach England. On Monday our tour was more or less officially ended by a visit to the Royal Veterinary College, London. Again, through the courtesy of Dr. Buxton, we had a very delightful time, and I am sure our visit to your fine country will never be forgotten by any of those who were privileged to come here. We opened our tour, so to speak, in Great Britain and we ended it here.

It has been a great experience. I for one have also been privileged to attend your Congress, and am certainly grateful for the opportunity. Shortly before leaving home to attend our veterinary convention in Canada I received an invitation to attend your meeting. The first information that came to me was something to the effect that I should discuss modern therapeutic agents as we use them. I did not fully realise that there was an addition to the topic, namely, " Agents not in common use in the United Kingdom." I was at a disadvantage in not knowing what you were or what you were not using in the United Kingdom, but I trust sincerely that you will get something worth while out of the paper.

I should like to make a few additional remarks regarding the items discussed in the manuscript.

In approaching this subject I had in mind several points. First, that I was talking chiefly and primarily to the individual who was interested in saving animals, livestock and pet animals. As a clinician I think there are possibly five questions that might be used as an outline and which should be answered. First, what is the substance we are considering?; secondly, what are the indications for the use

* Presented to the 71st Annual General Meeting and Congress of the British Veterinary Association, at Aberdeen, on September 9th, 1953.

of the substance?; third, what is the dose?; fourthly, what are the results that one can expect from the agent? And, finally, is it toxic, or what precautions must be taken when it is used?

In recent years, and I might say particularly since 1935-37, many new chemotherapeutic agents useful in veterinary practice have been introduced. In speaking with practising veterinarians they tell me that most of the drugs they had prior to that time are now seldom used. That is not the case with some of the alkaloids, but as far as treatment of infectious diseases is concerned, veterinary practice has changed. There has been a rapid development of these therapeutic agents. It is true there are many agents in this field, and regrettably the veterinary schools, at least those in the United States, do not have adequate opportunity to participate in many of these developments.

We draw upon data obtained in the experimental animal and then try to use the new agent in other animals, but there are occasional idiosyncrasies. I feel that many of the agents need further study in the various species, and as new ones come along I trust someone can study them in the different species that are presented to us as animal patients.

In the paper I have tried to summarise the clinical aspects of the sulphonamides and have indicated that we generally divide them into two categories, those that are well absorbed and those that are poorly absorbed. I have made reference to the combination of sulphonamides and the safety factor therein. That applies particularly to the older sulphonamides such as sulphanilamide and sulphapyridine. Some of these were not too safe when given in therapeutic amounts to the animal. If one wishes to use them perhaps it would be well to keep the dose of the individual drug low and combine two or more compounds in the total dose.

In the last year or so a new sulphonamide has been studied in the United States, sulphisoxazole, which is excellent as regards solubility. It does not maintain good blood levels, so that frequent dosage is necessary, and that sometimes is a disadvantage in the treatment of animal patients.

To a limited extent there has been another combination of sulphonamides which we have used, namely, mixtures of sulphonamides that are absorbed and those that are not absorbed from the gastro-intestinal tract. These are generally used for enteric infections although they do provide low blood levels. Some say that it might be dangerous to use these mixtures because the blood level is low, but so far as I am aware no one has had serious difficulty with resistant organisms in an animal so treated.

I believe that some of the sulphonamides, as they are being used to-day in the control of coccidiosis, greatly aid the poultry industry in controlling that particular disease. We have been told that there has been a mortality rate as high as perhaps 20 per cent. in certain cases of coccidiosis due to *Eimeria tenella*, but by the use of low concentrations of some of these sulphonamides, many poultrymen have found a solution to their problem.

In connection with the development of these sulphonamides several other compounds were identified and found to be useful in the treatment of blackhead in turkeys. They are administered in low concentrations in the feed for extended periods of time, usually when an outbreak of blackhead is imminent, and this measure certainly saves the turkey producers a great deal of money and worry.

Following the introduction of sulphonamides in the early 40's came the interesting and exciting development of the antibiotic substances. The first slide gives you a list of the antibiotics common to the veterinarian in the United States. (Fig. 1.)

ANTIBIOTICS OF CLINICAL IMPORTANCE

TYROTHRICIN

PENICILLIN

STREPTOMYCIN AND DIHYDROSTREPTOMYCIN

AUREOMYCIN

BACITRACIN

CHLORAMPHENICOL (CHLOROMYCETIN)

TERRAMYCIN

POLYMYXIN B

NEOMYCIN

ERYTHROMYCIN

Fig. 1.

Further slides followed and a brief discussion on the use of tyrothricin and penicillin (Figs. 2 and 3) was given.

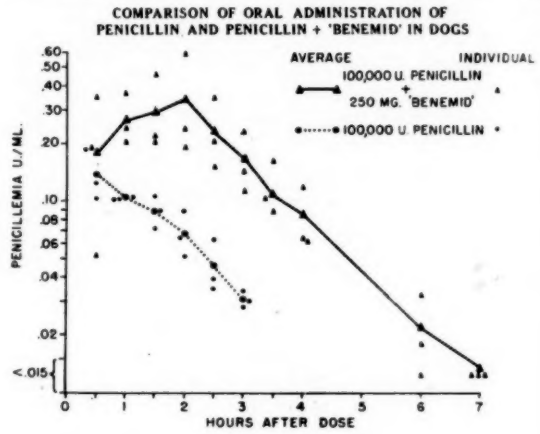

Fig. 2

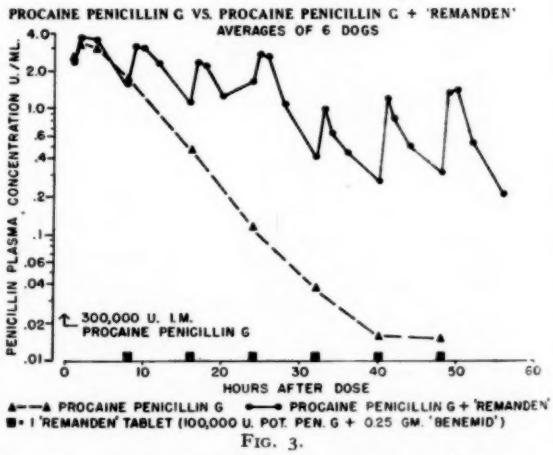

Fig. 3.

Dr. Scheidy continued: We have spent a good deal of time discussing penicillin, which is certainly a useful agent.

Streptomycin and dihydrostreptomycin hold a unique place in veterinary practice. Since the prices have been greatly reduced, they are extensively used in the United States.

Penicillin and streptomycin and a combination of the two have been a great asset in the therapy of bovine mastitis. However, there are still many cases of mastitis that we cannot treat satisfactorily. Following the development of streptomycin came bacitracin. Neomycin has been studied in the last few years for the treatment of bovine mastitis and to some extent for oral administration in the therapy of enteric infections. It does have activity in infections due to gram-positive as well as gram-negative organisms. Polymyxin, especially polymyxin B, is somewhat in the same category. The present signs are that this antibiotic will be very useful in the treatment of infections due to resistant organisms, notably *Pseudomonas aeruginosa*.

There is another category of antibiotic substances referred to as broad spectrum antibiotics—aureomycin, terramycin and chloramphenicol—and they certainly have wide application. These agents are extensively used. Price is the determining factor to some degree, but our veterinarians are employing them in many instances when the animal owner is willing to pay for them.

Very recently we have been given erythromycin. A few studies have been done with it, and I think it can be said that when penicillin does not do the job, possibly due to penicillin-resistant organisms, erythromycin seems to be indicated.

I have mentioned mixtures of sulphonamides. We have also a number of mixtures of antibiotics. I think much can be obtained from their use in the treatment of certain infections. However, several workers in your country and in the United States have discovered undesirable reactions as well as favourable results with certain mixtures of these substances.

We have attempted to review the hormone field in some detail, stressing some new agents such as ECP and ACTH and cortisone. We are beginning to use these compounds where the value of the animal warrants the expense. Being expensive agents, especially ACTH and cortisone, opportunities for using them are somewhat limited.

Currently there is considerable interest in studying enzymatic agents. Hyaluronidase is of interest in the human field and of some interest in the veterinary field.

We have several new anaesthetics, both local and general. You have in this country " Xylocaine," which is also being studied in the United States as well as is hexylcaine hydrochloride. You also have " Anavenol " which is currently being studied in the United States. I think you are far ahead of us in the use of " Anavenol."

Silicones are mentioned in the paper and one particular use for them is in the management of " frothy bloat " in cattle. Nitrofurazone is really not a new compound, but it may be a very useful chemotherapeutic agent. Colloidal silver oxide has been studied to some extent.

Just a word about blood plasma substitutes. I should like to read one note on this—" a satisfactory plasma expander should have the following attributes: an oncotic effect equal to that of plasma; remain in the circulation for more than a few hours; readily metabolised or easily excreted; non-antigenic or non-allergenic; no adverse effects on visceral functions; easily prepared in large quantities; stable and fluid at wide variations of temperature; non-pyrogenic; easily producible and cheap." I have a strong feeling that we in veterinary practice should use plasma and blood to a greater extent than is presently the case.

Polyvinylpyrrolidone has been studied. Unfortunately, it has been found that undesirable reactions develop. These have been recognised only in dogs. They have not been reported in humans to any extent or in other animals that have been studied. This compound is a substitute that may not be satisfactory for dogs.

A brief note on dextran indicates that it is a sterile non-pyrogenic solution of partially hydrolised dextran in isotonic sodium chloride solution—usually 6 per cent. concentration, intended for intravenous use in the prevention and/or treatment of shock due to haemorrhage, burns, trauma or surgical procedures.

Dr. Scheidy's paper was as follows:

Veterinary Application of Antibiotics and other Modern Therapeutic Substances

The rapid development of new therapeutic agents useful in the prevention and treatment of disease has aided us greatly in reducing the morbidity and mortality of livestock and poultry. It would appear that with the development of the sulphonamides and the antibiotic substances we have come into possession of very potent antibacterial agents. On the other hand, however, we do not yet possess agents that are effective in overcoming satisfactorily viral infections, fungus diseases and even some bacterial infections.

It is interesting indeed to study the application of these new agents because of the differences in their pharmacologic behaviour, in some respects, in various species of animals and because of their selective activities against certain infective organisms.

Aside from the substances that have been made available for the management of infectious diseases we have other new and useful compounds for veterinary use, such as anaesthetic and analgesic agents, hormones, antihistamine substances, blood plasma expanders, parasiticides, enzymes and nutritional supplements. All of these categories contain more than one agent, so that the veterinary clinician has a choice in selecting the agent that appears to possess the most desirable characteristics for use in each individual case.

This, then, has added much in recent years to the interest and satisfaction of general veterinary practice. It might be mentioned that a comprehensive review on sulphonamides and antibiotics in veterinary practice recently has been published in a book entitled " Advances in Veterinary Science " by The Academic Press, New York City, New York.

Sulphonamides

These compounds usually are divided into two groups :—

(1) Those that are used for systemic effect or generalised infections : sulphanilamide, sulphathiazole, sulphapyridine, sulphadiazine, sulphamerazine, sulphamethazine, sulphisoxazole and sulphacetamide.

(2) Those that are used in the prevention and treatment of gastro-intestinal tract infections : sulphaguanidine, succinylsulphathiazole, phthalylsulphathiazole, sulphaquinoxaline and phthalylsulphacetamide.

It is our understanding that most of these compounds are available throughout the United Kingdom; however, we are not entirely sure that you are using them as extensively as we are in North America. We are using many of the compounds in Group I as mixtures ; that is, two, three or even four of the compounds are used in one dosage form. The rationale for using such mixtures undoubtedly has been based on the observations of Lehr (1945) and of Frisk *et al.* (1947), who have shown that there is less danger of renal toxicity because of the independent solubilities of the independent compounds in the urine. With the development of the sulphapyrimidines (chiefly sulphadiazine, sulphamerazine,

sulphamethazine) and sulphisoxazole, we do have compounds that may be used singly without the likelihood of the renal damage that was so evident with the earlier compounds.

Many of our veterinarians prefer to administer sulphonamides intravenously or intraperitoneally (especially to ruminants) because of the prompt antibacterial action in the ailing animals, ease of administration, and small chance of digestive disturbances. Many of the systemic infections due to bacterial organisms, such as pneumonia, so-called shipping fever, septicaemia associated with metritis and mastitis, and even localised infections such as infectious pododermatitis, are treated in this manner.

The dose of these parenteral preparations usually is 0·075 to 0·10 gramme of total sulphonamide per kg. of bodyweight. Not infrequently subsequent oral administration of the compound or compounds in tablet or powder form and in doses of 0·15 gramme per kg. is used as maintenance therapy.

Under certain circumstances sulphonamide drugs are placed in the drinking water (using the sodium salts) or in the feed for the treatment of herds or flocks. This, however, is not without danger because of the uncertainty of dosage, especially in animals other than poultry.

One of the compounds in Group I mentioned previously is a relatively new compound used in veterinary practice. This compound is sulphisoxazole (3,4 dimethyl-5-sulphanilamido-isoxazole). According to available information, this compound is unusually soluble in the urine, which reduces the possibility of crystalluria ; this is the characteristic that attracted the clinicians' attention to it.

This, of course, was of particular interest to physicians—possibly more so than to veterinarians. Several pharmacologic studies in domestic animals in which the compound is well absorbed from the gastrointestinal tract following oral administration have been reported. In one study (Stowe, 1953) 0·214 gramme of sulphisoxazole per kg. of b.w. was administered orally to seven head of normal cattle weighing from 900 to 1,350 lb. The average concentrations per 100 ml. of whole blood ranged from 1·5 to 4·6 mg. during the first six hours following single oral doses. Subsequent concentrations were less than those for the six-hour value. When similar doses were given intravenously the average initial blood levels at one hour were 27·5 mg. per 100 c.c.; however, there was a rapid decline and the average value at six hours was 2·8 mg. per 100 c.c. This would indicate that there is a rapid excretion of the compound in the urine.

A study conducted in dogs, most of them suffering with distemper, recently was reported (Cairy, 1953). These animals received sulphisoxazole orally in tablet form at the rate of about 0·5 grain per lb. of b.w. per day. Blood levels were determined and it would appear that the values in these animals (dogs) were somewhat higher than those obtained in cattle given larger doses per lb. of b.w.

It has been pointed out that, because of the excretion of the drug in high concentrations through the renal system, it undoubtedly should have unique value in the treatment of urinary tract infections caused by susceptible organisms. Clinical reports (Stewart & Lash, 1950 ; Carroll, Allen & Flynn, 1950) in the medical literature seem to confirm this hypothesis.

The second group of compounds mentioned above are used chiefly in the management of enteric infections. Sulphaguanidine, succinylsulphathiazole, phthalylsulphathiazole and phthalylsulphacetamide are used as therapeutic agents for so-called bacterial infections causing diarrhoea, such as calf scours, swine enteritis and many diarrhoeal states associated with systemic disease. Sulphaquinoxaline, on the other hand, is used widely in the prevention and control of coccidiosis in poultry. It is provided generally in low concentrations in feed or drinking water and this apparently is an effective and economical procedure. Other compounds, such as nitrophenide (m-n-dinitro-diphenyl disulphide) (0·012 per cent.), a bisphenol, 4-4′ isopropylidenebis (2-isopropylphenol) (0·200·3 per cent.) and nitrofurazone (5-nitro-2-furaldehyde semicarbazone) (0·011 per cent.) in dry mash also have been shown to possess coccidiostatic properties in chickens. These agents are placed in feed in low concentration during the period that the birds are most likely to contract the infection and, like sulphaquinoxaline, are of special interest in broiler raising areas. It is in these areas where there is a great concentration of poultry that sometimes management and husbandry are not done skilfully enough to prevent infection, and by the prophylactic use of these agents morbidity and mortality rates from coccidiosis can be kept at a minimum.

In a recent report (Boyer & Brown, 1953) it was shown that sulphaquinoxaline and sulphamethazine were effective in the control of coccidiosis in turkey poults. This was an experimental study, quite well controlled, in which poults were exposed to several species of coccidia.

Thiametroimidine

This compound (2-amino-5-nitrothiazole) and a related compound (2-amino-5-nitropyrimidine) have been found to possess value in the control of enterohepatitis (blackhead) in turkeys.

The first-mentioned compound is used in our country to control this disease by mixing it in dry mash in a concentration of 0·05 per cent. and feeding *ad libitum* during the period when the birds are most likely to be exposed to the infection. The value of this preventive therapy has been demonstrated in experimental studies and in natural outbreaks in turkey flocks. The prophylactic action against enterohepatitis is obtained only while the drug is administered. Continuous feeding of the compound in a concentration of 0·05 per cent. for a period of 48 days apparently did not affect adversely the appetite for feed or water and the treated birds showed the expected growth of normal untreated birds maintained under similar conditions.

Turkeys treated with the compound during the course of the disease (produced either experimentally or naturally) did not develop resistance to subsequent exposure.

According to the information available at the present time, it would appear that this compound is of real value in reducing losses in turkeys when infection (enterohepatitis) has appeared and a serious outbreak is imminent.

Antibiotics

The term antibiotic, antibiotic agent, or antibiotic substance generally is used to identify metabolic products, produced by micro-organisms, that are capable of destroying, or inhibiting the growth of, other micro-organisms. There is, however, one exception to this rule at the present time in that one such substance, chloramphenicol, is prepared also by chemical synthesis. This group of chemotherapeutic agents indeed has received a great deal of attention in the past 8 to 10 years.

Tyrothricin

The first agent in this category to attract clinical importance was tyrothricin. It was originally suggested for, and still is used to some extent in, the treatment of bovine mastitis, especially in dry cows. The agent also is used in solution for the irrigation of infected cavities such as the uterus in cattle with low-grade infections, chiefly those caused by gram-positive organisms.

Penicillin

The second antibiotic substance of real clinical importance was brought to us in America by your distinguished scientists, Sir Alexander Fleming and Dr. H. W. Florey.

This substance is used extensively in North America by veterinarians as well as by physicians. The sodium or potassium salt of penicillin G is employed if prompt blood and tissue levels are desired, and the procaine salt in aqueous suspension or in oil is used as a repository dosage form for the maintenance of blood and tissue concentrations for relatively long periods of time. It usually is administered by the intramuscular route for systemic therapy and by intramammary instillation in the treatment of bovine mastitis.

Some veterinarians prescribe oral preparations of penicillin for use in dogs and cats. They usually give the initial dose intramuscularly and dispense or prescribe tablets containing penicillin for home administration as maintenance therapy.

The problem of obtaining and maintaining blood and tissue concentrations of penicillin has been studied in several ways. One is to administer the substance in a form so that it will be absorbed slowly—the so-called repository dosage form (Romansky formula containing oil and beeswax)—and the other is to utilise salts that disintegrate slowly, such as the procaine, benzethacil, or l-ephenamine salts of penicillin. Another scheme is the concomitant use of agents that compete with penicillin for elimination by the kidneys. Agents that have such effect in the renal tubular system are para-aminohippuric acid, Diodrast,* iodopyracet (diethanolamine salt of 3·5 diodo 4-pyrodone-N-acetic acid), carinamide (4[1] carboxyphenylmethanesulphonanilide), and Benemid,† probenecid (p-(di-n-propylsulphamyl)-benzoic acid).

The first two must be administered continuously in order to inhibit the excretion of appreciable amounts of penicillin ; however, the latter (carinamide and probenecid) may be given at intervals of hours during which they maintain their effectiveness in hindering tubular excretion of the antibiotic without seriously interfering with other functions of the kidneys.

These agents are used also to establish high levels of penicillin in animals and it is in this way that one can obtain maximal concentrations with minimal amounts of penicillin. In this manner one can obtain penicillin concentrations in extravascular spaces, and in higher concentrations than otherwise are obtainable. Russo *et al.* (in press) found that in dogs averaging approximately 13 kg. in weight, receiving 300,000 units of crystalline procaine penicillin G in aqueous suspension as a single dose, produced an average blood plasma concentration of 3·38 units per ml. of plasma two hours after administration. There was a gradual drop in the penicillin level so that at 38 hours post-administration an average level of 0·03 units per ml. of plasma was noted.

Using the same dogs in another experiment, a priming dose of 300,000 units of crystalline procaine penicillin G in aqueous suspension was given intramuscularly and at eight-hour intervals, for six periods a Ramanden ‡ tablet was given orally to each animal. Ramanden tablets contain crystalline potassium penicillin G 100,000 units and probenecid (Benemid) 0·25 gramme.

During this period, and for eight hours after the last oral doses were given, penicillin levels in excess of 0·20 units per ml. of plasma were maintained. Average values are given in Fig. 1. (Shown.)

Benzethacil (N-N′ dibenzylethylene-diamine dipenicillin G), a slowly disintegrating penicillin salt, is used chiefly for intramuscular administration in animals. Evidence has been presented (Huebner & Green, 1952 ; Glenny *et al.*, 1952 ; Huebner, 1952) that blood levels can be obtained for prolonged periods ; however, rather low levels are maintained with it. This salt of penicillin has another characteristic that is of special interest for use in human patients, in that preparations of it have a pleasant flavour when taken by mouth. For this reason it is quite widely used when oral administration is desired in human patients.

Penethamate, the hydriodide of diethyl-aminoethyl ester of penicillin G, is of some clinical interest since it has been shown to possess marked diffusibility into pulmonary tissue. It is used to some extent in human patients, chiefly in the treatment of pulmonary infections due to penicillin-sensitive organisms.

Streptomycin and Dihydrostreptomycin

Streptomycin and/or dihydrostreptomycin are used quite widely by our veterinarians in the management of infections caused by certain gram-negative organisms, chiefly members of the coliform group.

These antibiotic substances are favoured by some in the treatment of the scour-pneumonia complex of calves. In such cases part of the dose, 0·5 gramme, is given orally and 0·5 gramme or more is injected intramuscularly into young calves. If considered necessary, this dosage is repeated the following day.

These agents frequently are used in the treatment of bovine mastitis when it is known or suspected that gram-negative organisms are responsible for the infection. In many instances one (or both) is mixed with penicillin in aqueous solution or petrolatum ointment base for intramammary administration. The streptomycins are used also in the treatment of sinusitis in turkeys and some urinary tract infections in dogs and cats. Some veterinarians favour the use of streptomycin in the treatment of pyosepticaemia in young foals.

Bacitracin

Bacitracin is a useful antibiotic substance obtained from cultures of *Bacillus subtilis*. It is quite soluble in water but is not stable in solution for a long period of time. This is a disadvantage in some respects. The antibacterial activity of bacitracin is demonstrated chiefly against gram-positive organisms and in this respect it is similar to penicillin.

Early studies with bacitracin indicated that parenteral administration was not safe ; however, more recent reports indicate that within limits it may be administered intramuscularly without causing serious toxic effect. It usually is used for topical applications such as in wet dressings, solutions for irrigation, or ointment bases. Several reports indicating that bacitracin is of value in the treatment of certain enteric infections, such as diarrhoea in dogs and dysentery in swine, have been made.

Neomycin

Neomycin is produced by cultures of *Streptomyces fradiae*. It is used as the sulphate salt and is readily soluble in water, although it is not stable in solution for a long period of time. Neomycin possesses antibacterial activity against both gram-positive and gram-negative bacteria. It is used topically or orally—ordinarily not parenterally because of the nephrotoxicity it may produce. Following oral administration it is very poorly absorbed from the gastrointestinal tract. Because of its pharmacologic characteristics and systemic toxicity it is used chiefly for topical application in solutions or ointments, or for oral administration as treatment in enteric infections. Favourable reports following its use by intramammary instillation of solutions or ointments in the treatment for bovine mastitis have been published (Drury, 1952).

* Winthrop-Stearns, Inc., New York, N.Y.
† Merck & Co., Inc., Rahway, N.J.
‡ Merck & Co., Inc., Rahway, N.J.

Aureomycin—Terramycin—Chloramphenicol

These three agents frequently are referred to as the so-called "broad spectrum" antibiotic substances. This designation is given to them because they possess activity against many bacterial (gram-positive, gram-negative), large viral, rickettsial and some protozoan micro-organisms. Because of this broad spectrum of activity they are used widely in the treatment of disease. It should be pointed out, however, that they have not been found to be active in overcoming viral infections such as canine distemper, contagious canine hepatitis, Newcastle disease, rabies, or equine encephalomyelitis.

These agents usually are administered orally (except in adult ruminants), intravenously, or topically. When administered intravenously only freshly prepared solutions should be used. Recently a preparation of terramycin for intramuscular use was introduced. Oral administration of therapeutic amounts in adult ruminants is discouraged since the agents may have an adverse effect on the rumen flora and thus cause digestive disorders. An initial intravenous dose of 4 to 10 mg. per kg. of b.w. and one-half this amount at 12-hourly intervals has been suggested. For oral administration 20 to 50 mg. per kg. of b.w. and half these amounts at 12-hourly intervals have been found to be fairly satisfactory in many animal patients (adult ruminants excepted); and treatment is continued until the animal is asymptomatic. For topical or intramammary use, ointments containing these agents are recommended.

Polymyxin B

Polymyxin B is used to some extent by veterinarians in North America; however, most of the investigational and developmental work with this agent was conducted in Great Britain. We are particularly interested in the use of this substance in the treatment of infections caused by *Pseudomonas aeruginosa*. It usually is applied in aqueous solution or in an ointment base.

Erythromycin

Erythromycin, a recently introduced antibiotic agent, is produced by cultures of *Streptomyces erythreus*. This substance is relatively stable, is soluble in water, and is effective when given orally. In mice the LD50 is about 3,000 mg. per kg. of b.w. It would appear that clinically this substance has a spectrum of activity similar to that of penicillin. However, it has not been studied extensively in the treatment of infections in animals. The results obtained in one clinical study in dogs and cats indicate that this substance has value in the treatment of bacterial infections in small animals. In general, one 100-mg. tablet given every six or eight hours for three to five days is recommended; however, in large dogs or in severe infections twice this dosage is suggested.

Mixtures of Antibiotic Preparations

In the United States we have available for clinical use several mixtures of antibiotic substances. Such preparations have been made with the idea of increasing the spectrum of antibacterial activity and taking advantage of synergisms that may exist in certain combinations.

One of the most popular mixtures is that containing penicillin and streptomycin or dihydrostreptomycin in ointment form for the treatment of bovine mastitis. It is not infrequent that both gram-positive and gram-negative organisms may be present in an infected mammary gland and such mixtures, because of results obtained, have met with favour by practising veterinarians and dairymen.

Mixtures of tyrothricin and bacitracin have been found to possess marked antibacterial activity in experimental studies and ointments for topical use have been found to be useful clinically for the treatment of superficial wounds.

Other mixtures, such as penicillin, streptomycin and bacitracin in an ointment base, are used by intramammary instillation in cases of bovine mastitis.

A mixture of polymyxin B and bacitracin also has been used in ointment form for the local therapy of infected lesions.

The addition of penicillin and streptomycin to bovine semen has been found to be most useful in reducing bacterial contamination prior to artificial insemination. Indeed, there is some evidence that the conception rate of certain bulls has been increased by the addition of penicillin and streptomycin to diluted semen. Needless to say, such treatment often has great value when the semen of certain bulls is desired to maintain or improve certain blood lines in cattle.

Synergism and Antagonism

These phenomena are of both interest and concern to some of our veterinarians. Many believe that they have observed both synergisms and antagonisms of antibiotics in animal patients; however, it is very difficult to prove the point in clinical cases. A number of investigators have reported on such observations and it would appear that the results obtained depend greatly on the strain of the organism used in the test or causing the infection.

In brief, Jawetz & Gunnison (1952) have proposed that some of the useful antibiotic substances be classified into two groups:—

Group No. I contains penicillin, streptomycin, bacitracin and neomycin.

Group No. II contains aureomycin, chloramphenicol and terramycin.

These investigators have indicated that "members of Group I are frequently synergistic with each other, occasionally indifferent, but have never in our hands been antagonistic to each other. . . . Members of Group II are neither synergistic with, nor antagonistic to, each other, but simple additive effects are observed, presumably also obtainable by an increase in the dose of a single drug." They further state that, "combined effects between drugs of Group I and Group II are the most complex and depend on the relative susceptibility of the microbial strain. If the micro-organism is susceptible to the Group I drug, then Group II agents will frequently be antagonistic and reduce the effect of the Group I drug. This effect seems to be unilateral: Group I drugs do not interfere with Group II action against organisms tested thus far. If, on the other hand, the bacterium is Group I resistant (but can be inhibited by a large dose) then I plus II sometimes result in synergism, never in antagonism."

You will note that we have not mentioned the use of antibiotic substances in animal feeds, as growth stimulants, since this subject will be discussed by Dr. W. S. Gordon and others during this Congress. It should be stated, however, that these substances are widely used in animal feeds, especially for poultry and swine, in the United States.

Hormones

Within recent years remarkable advances have been made in our understanding of the use of hormones. Some of the agents used occur in nature, and others have been produced synthetically.

The development of the synthetic oestrogens, especially di-ethylstilbocstrol, seems to have stimulated the use of these agents in the veterinary field. This undoubtedly was partially true because of the fact that the synthetic product is considerably less expensive than are natural oestrogens, and at the

same time is equally effective. It is our opinion, however, that this substance is used in many animals in which the anticipated results are not obtained and this frequently is due to its misuse. You are familiar with its use in the management of the anoestrus females, incontinence of urine in the spayed dog, non-malignant prostatic disease in the dog, as an aid in the stimulation of lactation in non-bred heifers and cows (chiefly experimental), and for the so-called chemical caponisation of cockerels. This latter use is very popular in the United States.

Within the past few years another synthetic oestrogen, ECP,* estradiol cyclopentylate (17-beta-cyclopentylpropionate), has been used quite extensively in cattle and sheep in our country. It would appear that this compound is more active when the dose is calculated on a weight basis (mg. for mg.) than is diethylstilboestrol ; therefore, a smaller dose is suggested. According to a report by Gibbons (1951) 5 mg. of oestradiol cyclopentylate is a practical dose to stimulate oestrus in cattle. Easterbrooks & Plastridge (1953), however, suggested a dose of 4 mg. Excessive doses have been followed in some cows by unfavourable results, such as prolonged oestrus periods, straining, restlessness and a reduction in milk production. Several years ago this compound received considerable publicity as an agent to aid in obtaining two lamb crops per year. This, of course, was of much interest to many people including veterinarians. It is true that treated ewes exhibited signs of oestrus and were bred, but many apparently did not conceive ; thus the expected results were not realised.

Gonadotropins are used quite frequently by our veterinarians in the management of the female with cystic ovaries, especially in cows. Naturally occurring substances harvested from pregnant mare serum or chorionic gonadotropin obtained from urine collected from pregnant women are in common usage. Such therapy has replaced the removal by force or the puncturing of cysts in ovaries and, according to reports by Lentz (1944) and Fincher (1952), is useful and effective in many animals.

In the past few years interest in the hormone field has been directed mostly to the adrenal cortical substances. The field has been studied extensively by those interested in basic research in physiology as well as by clinicians, especially in human patients. Some studies in animal patients have been reported and it would appear that these substances will prove to be a great aid in certain abnormal conditions.

The cost of the materials and difficulty in obtaining them have been deterring factors in the wide application of the agents in the veterinary field.

Many functions have been assigned to the substances elaborated by the adrenal cortex. Sayers (1950) has expressed the thought " the various functions of the cortical hormone are the varied expressions of a ubiquitous single action, albeit complex, concerned with the mobilisation of energy for cellular work, regardless of the type of cell involved or the nature of the work performed." It has been demonstrated that the adrenal cortex secretes increased amounts of cortical hormone in response to many unrelated stimuli, such as heat, cold, starvation, fatigue, anoxia, etc., that tend to alter the animals' internal environment. Associated with an increase or decrease in the secretory activity of the adrenal cortex certain changes occur in the behaviour of the organism. Some of these can be used in studying the experimental animal, or clinically to test the activity of the adrenal cortex in the patient. In general, where there is an increase in the size of the gland, there also is an increased activity, while with atrophy of the gland, there is associated a decreased function of it.

Removal of the anterior lobe of the pituitary gland results in a marked atrophy of the adrenal cortex, whereas repeated administration of the adrenocorticotrophic hormone (ACTH) results in hypertrophy of the adrenal gland.

Administration of adrenal cortical extract or cortisone, as well as desoxycorticosterone (a synthetic adrenal cortical-like hormone), results in an atrophy of the adrenal cortex in the normal animal. Such action usually is reversible and the gland returns to its normal size after the replaced therapy is discontinued.

It is recognised that the adrenal cortical hormone or hormones play an important rôle in regulating or influencing a number of metabolic functions in animals.

The steroids that have been isolated from the adrenals or prepared synthetically are of particular interest in clinical medicine and have been divided into the so-called glucocorticoids (chief action on carbohydrate, protein and fat metabolism) and mineral corticoids (main effect on electrolyte metabolism). Examples of the glucocorticoid group are cortisone (17-hydroxy-11-dehydrocorticosterone-Compound E) and 17-hydrocorticosterone-Compound F (Kendall). One important effect of these substances is to increase gluconeogenesis (formation of glucose from protein or other non-carbohydrate sources). Desoxycorticosterone, a synthetic compound, is considered to be a mineralocorticoid and has its chief effect on electrolyte metabolism. It is the former compounds in which veterinarians are greatly interested because of their use in the management of disease conditions in animals, such as ketosis in cattle and pregnancy disease in sheep.

Several other actions of cortisone are of interest to the clinician at this time since they, too, are useful in the management of patients. These actions might be referred to as an anti-inflammatory in acute conditions and as an anti-allergic.

Cortisone is one of a series of 28 crystalline compounds isolated from the adrenal cortex ; it was first reported by Mason and associates in 1936. At that time it was identified as Compound E. Sarrett, in 1944, reported the synthesis of cortisone from a cholic acid. Since that time other production procedures have been developed.

Cortisone, as previously indicated, is a steroid compound. It is characterised by an oxygen atom substituted on the carbon atom 11 of the steroid nucleus. Cortisone and other compounds having this structural arrangement are referred to as the 11-oxysteroid group. This is in contrast to another group of compounds known as the 11-desoxysteroid group in which the atom 11 does not have an oxygen atom attached to it. The importance of this structural arrangement is that the 11-oxysteroid group possesses primarily a gluconeogenic activity, while the 11-desoxy compounds have as their chief physiologic characteristic an effect on the retention of salt and water. Cortisone is active when it is administered by intramuscular or subcutaneous injection, by mouth (to most animals), or topically.

Adrenocorticotrophic hormone (ACTH), a naturally occurring hormone, is obtained by extraction from the anterior pituitary glands of domestic animals. Chemically it is a complex protein substance. For veterinary use, and to prolong its activity when it is injected into an animal, it is added to gelatine. This preparation is available in the United States under the trade name of Adrenomone.* This substance is recommended for subcutaneous or intramuscular administration and its action is to stimulate the secretion of adrenocortical steroids.

Shaw *et al.* (1948, 1950, 1951) and Dye and associates (1953) have reported the successful treatment of cases of uncomplicated ketosis in dairy cattle with cortisone acetate as well as

* The Upjohn Co., Kalamazoo, Mich.

* The Armour Laboratories, Chicago, Ill.

with ACTH. It would appear that a dose of from 0·5 to 1·5 grammes of cortisone acetate given intramuscularly to cows with uncomplicated ketosis usually will elicit a response even though the animals have failed to respond to the conventional or popular treatment with dextrose, administered either intravenously or subcutaneously, or by both routes. Because of the cost involved, the dextrose treatment usually is given and if that fails the more expensive agent is used, provided the value of the animal warrants such an expenditure. Investigators who have reported on the use of ACTH as an aid in the treatment of ketosis usually administer about 200 to 600 mg. intramuscularly and if necessary repeat it daily for several days. This agent, of course, is used with the idea that it will stimulate the adrenal cortex and increase the output of the normal adrenal cortical hormones, which in turn will have the desired physiologic effect on the metabolism in the patient.

Cortisone has been used for its anti-inflammatory activity in the treatment of ophthalmologic conditions in dogs as reported by Magrane (1951). In this study it was applied topically or by subconjunctival injection. For topical application a 1 : 4 suspension of cortisone acetate in saline solution was used. Drops of the preparation were applied hourly during the first day and then at two- or three-hourly intervals for the duration of the treatment. For subconjunctival application 0·1 to 0·3 ml. of a solution containing 25 mg. of cortisone acetate per ml. was used. The injection was made on the dorsal area and 4 to 5 ml. from the limbus. Repeated administrations were made at 48- to 72-hourly intervals when necessary. The following conditions were treated :—

conjunctivitis,
iritis,
uveitis,
corneal ulcer,
keratitis,
keratoconjunctivitis,
subconjunctival haemorrhage.

In the presence of infection antibiotic therapy also was provided.

A limited number of cases of arthritis in animals, referred to as rheumatoid arthritis, have been treated with cortisone. Misener & Stanton (1951) and also Baumgarten & Siegmund (1952) have reported on such cases in dogs, and Doyle *et al.* (1950) on studies in swine.

Encouraging results have been obtained in a limited number of cases of mastocytomas in dogs when cortisone was administered. Bloom (1952) published a report in which an eight-year-old spitz dog was treated daily with cortisone acetate (100 mg. intramuscularly for nine days). At the termination of treatment the tumour had disappeared macroscopically, and, microscopically, neoplastic cells showed a marked degeneration. Several other similar reports have been made.

For a more detailed discussion on the action and uses of these substances, cortisone and ACTH, we should like to refer you to an excellent review publication by Martin (1953).

Enzymes

The use of certain enzymes in veterinary practice has been found to be interesting since these agents not only assist in the penetration of antibiotics, thus facilitating contact with the invading organisms, but also are useful as a means of causing débridement of suppurative processes. The lytic property of these agents causes rapid lysis of purulent or fibrinous exudates and blood clots in necrotic and suppurative wounds, thus f cilitating removal of this debris and therefore sparing the newly formed regenerative tissue and helping to hasten the process of healing.

Streptodornase and Streptokinase

Streptokinase and streptodornase are extracellular enzymes produced by certain strains of streptococci. Material available to us for clinical use is provided in a vacuum dried desiccated mixture of the enzymes containing 100,000 units of streptokinase and 25,000 units of streptodornase. These agents were chosen since it is known that most strains of streptococci isolated from suppurative and invasive types of infection possess fibrinolytic properties.

Christensen (1945) believes that the fibrinolytic activity of streptococcal enzymes is due to the activation of a fibrinolytic substance normally present in human serum. He identified this factor as "plasminogen," a serum euglobulin. The theory is proposed that the inactive precursor is converted by streptokinase into the active enzyme "plasmin" which then catalyses fibrinolysis. In other words, fibrin, a large insoluble protein, changes under the influence of plasmin into several smaller soluble proteins.

Sherry and his associates (1949) have shown that one of the principal constituents of purulent exudates is desoxyribonucleoprotein.

This factor influences the character, viscosity, and the amount of sediment in an exudate. An enzyme, desoxyribonuclease, whether of streptococcal origin (as found in streptodornase) or of pancreatic origin, has the capability of acting only on extracellular nucleoprotein, or on nuclei in degenerating cells. It catalyses the chemical degradation of the nucleic acid present, thus liquefying pus and other thick body fluids.

Streptodornase and streptokinase may be diluted with buffered physiologic saline solution to obtain the concentration of the enzymes desired for use. The clinical value of the enzymes has been established in human patients as an aid in the treatment of haemothorax, haematoma, empyema and chronic suppurations such as draining sinuses, osteomyelitis, infected wounds or ulcers, sinusitis, otitis media and suppurative arthritis.

It has been suggested that these enzymes should not be employed in the presence of active haemorrhage or acute cellulitis without suppuration, nor should they be administered intravenously.

Archibald & Hodgson (1953) recently published their findings on the use of streptodornase and streptokinase in wounds in dogs and cats. Streptokinase, 15,000 units, and streptodornase, 3,750 units, administered either alone or in combination with penicillin injected directly or around the infected area, gave encouraging results in the treatment of septic arthritis, wounds, acute mastitis with abscess, osteomyelitis, and endometritis in small animals. Penicillin also was given parenterally to some of the animals. The authors concluded that enzymatic débridement is indicated for "routine use in the treatment of infected wounds in small animals."

Pancreatic Dornase

Pancreatic dornase is prepared from frozen beef pancreas by an acid extraction, followed by fractional precipitation with ammonium sulphate. The final enzyme solution is sterilised thoroughly by passing it through a bacterial filter, after which it is frozen and lyophilised. The action of pancreatic desoxyribonuclease, although similar to that of the enzyme of streptococcal origin, is characterised by a depolymerisation in which the end products of the reaction are larger than are those resulting from the action of streptodornase (McCarty, 1946). It is believed that this less complete degradation decreases the amount of noxious substances that might be absorbed into the system of the patient, and, therefore,

theoretically permits recovery with less systemic effect.

Since pancreatic dornase has a lytic action on both mucus and mucopurulent material, the dual enzymatic activity of the agent and its low toxicity permit its application as a spray, irrigation of the cavity or lesion, or wet dressing. The diluent for reconstituting pancreatic dornase is a saline solution buffered with phosphate.

No specific dosage of pancreatic dornase can be given at this time since the amount required probably will vary with the condition as well as with the volume of purulent exudate, debris, or area to be treated. However, various concentrations have been used successfully in clinical investigative studies as an aid in the treatment of mastitis, abscesses, wounds, peritonitis and sinusitis in dairy cows, fistulous withers, sinusitis, abscesses and wounds in horses and similar conditions in other animals including sheep, goats, dogs and poultry.

Trypsin

A highly purified crystalline trypsin derived from mammalian pancreas glands is of clinical interest for the enzymatic débridement of infected lesions. It may be applied to the area to be treated, by direct application as a powder, deposit of the dry powder in gelatine capsules in sinuses and fistulas, in solution as dressings, or by irrigation.

In general, trypsin may be used wherever necrotic tissue is present. In human patients it is used in the treatment of osteomyelitis, ulcers, gangrene, soft tissue abscesses, sinuses and fistulas, burns, haematomas, empyemas and haemothorax. In the veterinary field it has been reported (Johnson, 1952) to be of value as an aid in the treatment of frontal sinusitis and traumatic pericarditis in cattle, and in suppurative arthritis and fistulous withers in horses.

The amount of the agent necessary for therapeutic efficacy is a function of the size, character and location of the lesions to be treated as well as the amount of necrotic tissue present. It is recommended that in small lesions, such as ulcers, the drug be applied every 15 to 30 minutes to obtain maximal proteolytic effect. In larger lesions the agent should be applied at least every three hours.

Hyaluronidase

Duran-Reynals, in 1928, first noted that a testicular extract contained a " spreading factor " which facilitated the movement of virus vaccine when it was injected into rabbits and it was Meyer *et al.* (1936) who determined that this phenomenon of increased diffusibility was caused by the breakdown of hyaluronic acid by the enzyme hyaluronidase.

Partially purified hyaluronidase in desiccated form is available commercially. Since it aids in the distribution and possibly in the rate of absorption of fluids into the body, it is recommended clinically as an alternative to intravenous administration where subcutaneous infusions of large amounts of fluids are needed.

Successful results also have been observed following the use of a combination of hyaluronidase and local anaesthetic solutions ; the use of the mixture increases the anaesthetised area with a more rapid onset of anaesthetic effect.

Studies in human patients (Butt *et al.*, 1952) seem to indicate that hyaluronidase may be used both as a prophylactic agent and as an adjunct in the treatment of renal lithiasis. It has been found that the subcutaneous injection of hyaluronidase mixed with isotonic sodium chloride solution results in the release of protective urinary colloids that disperse aggregates of crystals already present in the urine and inhibit the formation and growth of new crystalline matter. One subcutaneous injection is effective within 30 minutes after injection and the effect persists for 24 to 72 hours. A dosage of from 150 to 900 turbidity reducing units every 24 to 48 hours seems to be effective in reducing the formation or reformation of stones.

Although the toxicity of hyaluronidase is of a relatively low order, the possibility of allergic reactions should not be overlooked and its use should be stopped when indication of sensitisation is noted.

Anaesthetics and Analgesics

Methadone

Methadone (6-dimethylamino-4,4 diphenyl-3-keptonone) was introduced to scientists in the United States during World War II. It was synthesised in Germany and might be considered a morphine substitute. The compound has undergone intensive investigation in various laboratories in our country. Like morphine, it apparently has a profound action on the central nervous system. In dogs it elevates the thermal threshold and, when compared with morphine sulphate, methadone hydrochloride is considered to be twice as active as an analgesic on a weight basis (Scott *et al.*, 1947). This has been demonstrated in rats, dogs and man. The drug also produces sedation, which is a desirable characteristic in most instances. It does not cause the vomiting in dogs that usually is observed when morphine is used.

Scott & Chen (1946) reported that methadone, like morphine, will cause excitement in cats. In dogs it has been shown that morphine has a much greater pressor effect than does methadone as demonstrated by the use of blood pressure tracings in anaesthetised animals.

Burroughs (1953) has reported on the use of methadone narcosis in dogs and indicates that a dose of approximately 1 mg. per kg. is satisfactory. He states that methadone is an efficient, safe, useful drug in clinical canine practice as a powerful analgesic and narcotic agent, that it will relieve pain, which facilitates painful manipulations, that it is a depressant when used with local anaesthetics, that it is useful as a pre-anaesthetic drug to be used with a general anaesthetic agent, and that the recovery pattern is smooth.

Hexylcaine Hydrochloride

Hexylcaine hydrochloride, 1-hexylamino-2-propyl benzoate hydrochloride, was synthetised by Hancock and his associates (1944) during their search to find an agent that combined a wider spectrum of useful anaesthetic activity with a greater margin of safety. While undergoing extensive clinical trials both in human patients and in animals it has been indicated that this agent has not only potency equal to twice that of procaine, but also exhibits longer duration of anaesthetic effect with relatively low toxicity. This compound, when administered intravenously in doses of 4 to 5 mg. per kg. of b.w., produced only a transient effect on the blood pressure, heart rate, and respiration of anaesthetised dogs (Beyer & Latven, 1952).

Roberts (1950), in evaluating several local anaesthetic agents in cattle, reported that the prolonged duration of anaesthesia, average 8·8 hours, produced by 5 and 10 c.c. of a 5 per cent. solution of hexylcaine administered epidurally, may be used to advantage in the management of straining following parturition, prolapse of the uterus and vagina, and in other surgical procedures in the bovine. This investigator described other useful characteristics of hexylcaine in animals: 1 and 2 per cent. solutions produced satisfactory topical anaesthesia of the cornea of the eyes of both horses and cows. The onset of anaesthetic effect occurred in from one to four minutes and the anaesthesia remained for approximately one hour. In paravertebral nerve block in the bovine good anaesthesia was maintained for three hours by the injection of 10 c.c. of a 5 per cent. solution over each nerve.

Other investigators (Wheat, 1952 ; Bullard, 1952) also have published their clinical experiences with this new local anaesthetic agent in both large and small animals where the agent was administered for epidural (caudal) anaesthesia, infiltration anaesthesia, nerve block anaesthesia, and topical anaesthesia.

Although hexylcaine is now supplied in both 1 and 5 per cent. sterile solutions, it has been found that it is possible to obtain satisfactory anaesthesia with lower concentrations. From 50 to 75 c.c. of 1 per cent. solutions have given satisfactory anaesthesia for caesarean operations in sow and ewe. For epidural anaesthesia, concentrations of 0·5 to 5·0 per cent. in amounts of 5 to 20 c.c. have been used with the advantage of producing sensory anaesthesia without extensive motor paralysis ; in paravertebral nerve block, a 5 per cent. concentration produced anaesthesia lasting approximately three hours ; in skin infiltration, it was unnecessary to use concentrations greater than 1 per cent. and, for topical anaesthesia of the eye, solutions containing 1 or 2 per cent. are satisfactory.

Thiamylal

In the field of anaesthesia the search also continued in an effort to find the ideal barbiturate. Reutner & Gruhzit (1948) have published their investigative studies conducted in dogs with surital sodium* (sodium 5-allyl-5- (1-methylbutyl)-2-thiobarbituric acid). This agent was studied in 72 dogs wherein it was administered intravenously, orally or intraperitoneally for the induction of general anaesthesia and for the maintenance of surgical anaesthesia wherein additional amounts were required. Doses of 17·5, 20 and 22·5 mg. per kg. of b.w. were used. Smooth, rapid induction occurred with a dose of 17·5 mg. per kg. ($\frac{1}{4}$ gr. per lb.) administered intravenously, and surgical anaesthesia lasting approximately 15 minutes was produced. Recovery was free of side reactions and was complete in three to five hours. The investigators indicated that when unforeseen difficulties were encountered so that additional anaesthesia was required, one-fourth of the original dose was administered. The duration of surgical anaesthesia was increased by the preoperative use of either morphine or methadone.

The investigators conclude from their observations that, as with most barbiturates, respiration was depressed ; in fatal doses it stopped a few minutes prior to heart failure.

Silicones

Within the past few years some of the organic silicones have been employed to advantage in veterinary medicine. One of these new uses is in the preparation of glassware such as containers and syringes. The glass containers for penicillin products are treated by baking a film of these agents on the inside wall to prevent the adherence of the penicillin suspension so that it is possible and convenient to remove from the container all, or nearly all, the material originally placed in it. This is indeed a great asset since in the early days of penicillin therapy it was difficult to remove accurately the amount of antibiotic suspension for administration to a patient. To-day that uncertainty has been removed. Syringes can be treated in a similar way.

Another and vastly different use for the silicones is in the treatment of so-called "frothy bloat" in ruminants. Suspensions of these agents are administered through a stomach tube, as a drench, or through a trocar cannula directly into the rumen. It is considered advantageous to administer the agent in a form that is readily dispersed throughout the mass in the rumen and, therefore, aqueous suspension in the presence of a dispersing agent is used. The indications are that if these agents are administered properly and in sufficient time they will serve well in controlling the distress so frequently observed in ruminants suffering with frothy bloat.

Recently there has been some interest also in using these agents in the feed of cattle (they are mixed with the feed and are fed daily) as a prophylactic measure during the time that cattle are most likely to develop gaseous distension in the rumen.

Nitrofurazone

Nitrofurazone (5 nitro-2-furaldehyde semicarbazone), a synthetic compound in solution, is used topically as treatment for localised infections. It has been demonstrated in *in vitro* tests that the compound possesses bacteriostatic activity against several gram-positive and gram-negative pathogenic bacteria (Dodd & Stillman, 1944). It was previously mentioned that the compound is in use in the control of coccidiosis based on studies reported by Harwood & Stunz (1949). For such use the drug in powder form is admixed with dry feed.

Guthrie (1952) found nitrofurazone effective in the treatment of enteritis due to *Salmonella choleraesuis* in young pigs. The drug was given in the feed or with the use of a stomach tube.

Solutions of the compound administered by intramammary infusion have been used by Mires (1950) and Kakavas *et al.* (1951). These workers report that it is non-irritating to the udder tissue and effective in eliminating infection. Kakavas and associates (1951) also mixed nitrofurazone with penicillin to obtain a broader spectrum of activity. Such a mixture also proved satisfactory.

Colloidal Silver Oxide

Colloidal silver oxide suspended in a petrolatum base or mineral oil is used as a topical application in the treatment of localised infections by some of our veterinarians. According to reports by Weirether *et al.* (1941) and Klein and associates (1941) such a preparation possesses value in the management of bovine mastitis. Suspensions containing 2·5 to 10 per cent. silver oxide in 10 to 20 ml. doses per quarter were used. In some animals marked local reactions were noted. Currently, this treatment is used chiefly in dry cows. Occasionally a treated quarter remains non-functional.

This agent in a petrolatum base is used orally in the prevention and treatment of so-called calf scours as well as in the uterine cavity in cows suffering with endometritis. Data supporting the apparent antibacterial and pharmacologic activity of the compound are not available to us ; however, clinical reports would indicate that the local application of this form of the silver salt does possess some value in the treatment of infected cavities and certain infections in the gastrointestinal tract.

Plasma Expanders

In the management of shock and severe haemorrhage in animals, especially in dogs and cats, so-called blood plasma substitutes are of interest and used by our veterinarians. Needless to say, many patients also need whole blood in case of haemorrhage, parasitism or other serious disease. In many veterinary hospitals donor dogs or blood banks are maintained for this purpose. In the management of shock, however, plasma expanders are of interest.

Several years ago gelatine solutions were introduced for this purpose. Two types of such solutions are available, one of small molecular size and another of larger molecular size, the latter of course being the most desirable and effective in the prevention and treatment of the shock patient.

* Parke, Davis & Co., Detroit, Mich.

In a report by Allam (1947) it is stated that the P-20 gelatine derived from long bone collagen and administration in a 6 per cent. concentration in 0·85 per cent. saline solution produced favourable response in dogs. It is indicated that the solution is non-antigenic, non-pyrogenic and free from sensitising impurities (Parkins *et al.*, 1944). Prolonged and repeated use of this plasma extender in dogs did not cause any serious liver or kidney damage, or adverse alterations in the function in damaged kidneys (Koop, 1947). The solution also contains a small portion of protein that may be of some nutritional value.

Some preparations containing other types of gelatine, usually of smaller molecular size, also have been used ; however, lack of favourable response was noted and it is undoubtedly due to the fact that they are rapidly excreted by the kidney and thus of no greater value than physiologic saline solution.

A recent report by Perlmutt and associates (1953) contains information indicating that one of the new plasma extenders, polyvinylpyrrolidone (PVP), may not be satisfactory for use in dogs. These investigators have conducted many studies with plasma extenders and noted several reactions in various species of animals.

This agent PVP causes in dogs what they choose to term "canine reaction." This consists of hypotension and generalised urticaria not noted in other animals. Due to this species sensitivity, the true nature of which is not understood, PVP is not considered a suitable replacement fluid for the management of shock in dogs. Variable response was noted with intravenous doses of 0·3 to 0·5 ml. per kg. of PVP and more severe reactions following the use of 3 ml. per kg. doses.

Cortisone, when given prophylactically for five days prior to the injection of PVP, decreased the severity and duration of the " canine reaction."

Summary

A review is made of some recent therapeutic advances of veterinary interest.

Of the sulphonamides special attention is directed to sulphisoxazole (3,4 dimethyl-5-sulphanilamido-isoxazole) and to the use of sulphonamide mixtures.

The value of 2-amino-5-nitrothiazole and the related compound 2-amino-5-nitropyrimidine in controlling enterohepatitis in turkeys is discussed.

In the antibiotic field attention is given to tyrothricin, penicillin, streptomycin and dihydrostreptomycin, bacitracin, neomycin, aureomycin, terramycin, chloramphenicol, polymyxin B, and erythromycin. The use of mixtures of antibiotic preparations and the present information on synergism and antagonism are discussed.

Methods of prolonging penicillin blood levels are detailed including the use of repository dosage forms, and the concurrent employment of agents such as para-amino-hippuric acid which delay excretion.

Details are given of recent U.S. developments with oestradiol cyclopentylate, and the gonadotropins. Cortisone and the adrenocorticotrophic hormone (ACTH) are discussed particularly in relation to ketosis in cattle and pregnancy disease in sheep.

The use of certain enzymes in veterinary practice to assist penetration of antibiotics and to cause débridement of suppurative processes is examined. Streptodornase and streptokinase, pancreatic dornase and trypsin, are discussed.

Attention is directed to the possible use of hyaluronidase in the prophylaxis and treatment of renal lithiasis.

In the anaesthetic and analgesic fields details are given of methadone hydrochloride as a substitute for morphine. The new local anaesthetic, hexylcaine hydrochloride, is discussed and information is provided on thialmylal (surital sodium), an intravenous general anaesthetic for dogs.

Mention is made of the use of silicones for the treatment of glassware and syringes so that substances which normally adhere to them such as penicillin preparations can easily be removed. Their value in frothy bloat in ruminants is also mentioned.

Information is given on the use of nitrofurazone as an antibacterial agent and on results obtained with colloidal silver oxide preparations against bovine mastitis, calf scours and bovine endometritis.

Finally, details are provided of plasma substitutes in use in veterinary practice in the U.S.A., and of their value in the treatment of shock.

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Discussion

The CHAIRMAN: I now call upon Mr. Ogilvie. Mr. Ogilvie needs no introduction and because of the important post he holds he is in a unique position to open the discussion. (Applause.)

Mr. D. D. OGILVIE (Manchester): It is the prerogative of the opener of a discussion to be the first member of the audience to congratulate and thank the essayist. I want to avail myself of that prerogative to-day and on your behalf as well as for myself to say how very pleased we all are with the paper Dr. Scheidy has presented to us. (Applause.) Anyone who undertakes, as he has done, to review the whole field of chemotherapy in the compass of a short time needs courage, knowledge and energy, qualities which I am sure Dr. Scheidy displays to the full. This field of chemotherapy is of absorbing interest but increases daily in complexity. Where originally a mere handful of European workers wrestled with a few selected problems, literally hundreds of research teams throughout the world are now engaged on a vast range of topics. Their spectacular discoveries are perhaps few in relation to the great effort which is being made but all the time they are advancing our knowledge at a steady pace. To keep abreast with these advances is alone a full-time occupation for a man like Dr. Scheidy. Add to it the fact that he has come here to-day, at no little personal inconvenience and at the end of a long and exhausting tour of Europe, and I think you will agree that we owe him a real debt of gratitude. (Applause.)

I wonder how many people who are here to-day know how Dr. Scheidy, or for that matter myself, come to be here at all. I believe that the Organising Committee intended in the first place that no less a person than Sir Alexander Fleming should deliver the paper. Sir Alexander would, I am sure, have been delighted to do so but when he received the invitation he was about to involve himself in a field other than chemotherapy though perhaps just as hazardous, namely, the matrimonial field. So he had to reply with regret, but perhaps somewhat aptly, that he was otherwise engaged. At that time I was in Turkey and Dr. Scheidy was in the U.S.A. I might have thought that in Central Anatolia I would be far from the long arm of the Organising Committee in Aberdeen and I am sure that Dr. Scheidy knew nothing at all of the fate which was in store for him. But such has been the march of progress that no one is safe. A cable reached me in Bursa where I was staying with a Turkish veterinarian, Mr. Akin, who I am glad to say is with us to-day. It put things rather well. After a nice preamble it ran something like this. "Can you get a good man to do the job, and if not can you do it yourself?" (Laughter.) The double edged compliment of this invitation spurred me to cable at once to Dr. Hardenburgh and Dr. Scheidy in Chicago and I was delighted, as I know everyone was, when I heard by return that Dr. Scheidy would undertake the task. He was by then within a few weeks of leaving the States but at that very short notice he set to and wrote the paper, keeping up meanwhile a lively stream of replies to the enquiries with which at long distance we bombarded him. Now he is obviously glad to be here and it is only a pity that he cannot stay with us until the end of the Congress.

And need I say that I am glad to be here? When you live in or near Manchester you are always glad to be somewhere else and Aberdeen has for me very happy memories. Twenty-one years ago I was lucky enough to see practice for the first time at Laurencekirk, not far from where we are now, under the skilled and kindly guidance of Bill Robson and his father. I'm afraid I was rather a handful to them but they were very good to me and anything I know about practice I really owe to them. Looking back over what seem to be only a very few years I find it difficult to think of Bill as the Chairman of the Organising Committee of this Congress and myself as a speaker at it. But such things must happen, I suppose, with the march of time.

I propose, Mr. Chairman and ladies and gentlemen, to open the discussion on Dr. Scheidy's paper by dealing with each section of chemotherapy as set out by him and by limiting myself to those sections. Any extension of the discussion into other fields of chemotherapeutic endeavour would, I think, be improper for me although doubtless Dr. Scheidy will be happy to deal with general questions on American practice in chemotherapy outside the scope of his paper which may arise in general discussion.

I do not know that I agree altogether with Dr. Scheidy's division of the sulphonamides into those with systemic effect and those used for gastro-intestinal tract infections. The point has been made elsewhere and I make it again that it is often just as essential to obtain a good blood level in dealing with gastro-intestinal disorders as it is with other infections. Organisms cause disease by active invasion of the intestinal mucosa and can often only be reached by readily absorbed sulphonamides through the blood stream. Certainly this is the modern trend of thought in human medicine and the vogue for sulphonamides of low solubility with supposedly special local activity has, I think, passed. I find sulphacetamide a surprising inclusion in Group I of the sulphonamides and phthalylsulphacetamide equally surprising in Group II. In our tests sulphacetamide has always shown low intrinsic activity against pathogens of veterinary importance and we have never advocated it for either systemic or local gastro-intestinal use. Indeed in the veterinary field in Britain its use has been restricted, rightly I think, to ophthalmic work and even there it has been employed more because solutions of it approach isotonicity than because of any marked activity which it has. Perhaps Dr. Scheidy can tell us whether American work has revealed any special reasons for systemic use of sulphacetamide. I have also criticised elsewhere the increasing tendency, especially in the human field, to use combinations of sulphonamide drugs rather than suitable individual preparations. The idea of double or triple sulphonamide mixtures began in human medicine as Dr. Scheidy has described but surely the same criteria do not apply in the veterinary field. Because of differences in direct solubility and in the solubility of acetyl derivatives in animals as compared with man, there is not the same danger of renal toxicity in the former. Nor in animals do we require nor should we wish to use the more toxic sulphonamides which are still sometimes employed in man. We should not need, therefore, to fall back on the artifice of polypharmacy to avoid toxic effects. I reinforce Dr. Scheidy's views, that in the sulphapyrimidines we have a group of sulphonamides which can be used singly in veterinary practice without risk or hazard, and wide usage has supported his assertions. On the question of doses of sulphapyrimidines we prefer to use just a little more than the amounts advocated by Dr. Scheidy. For sulphamezathine, for example, we have shown that in general the best therapeutic effects are given by an initial dose of 0·2 gramme per kg., followed by 0·1 gramme per kg. daily, although it must be admitted that particularly susceptible infections will often clear up on doses of about half this size.

Sulphisoxazole is a compound of considerable interest and one I am glad Dr. Scheidy has mentioned. Incidentally it is, of course, not a sulphapyrimidine as stated by Dr. Scheidy earlier in his paper, although some of its actions closely parallel those

of the sulphapyrimidines. Although sulphisoxazole is, as Dr. Scheidy says, quite new to veterinary practice it is a relatively old compound which has been known for years. All sulphonamides are, of course, a compromise between solubility, which means low risk of renal toxicity, and persistence which permits reasonable lapses of time to exist between doses. Sulphisoxazole has very high solubility, *i.e.*, a high affinity for water molecules, but poor persistence, *i.e.*, a low affinity for protein molecules. It is excreted very quickly and frankly I don't regard it as the ideal substance for veterinary work where persistence is of great economic importance. In selecting sulphamezathine from the various sulphonamides discovered by us in the early days of work with this group of chemicals we regarded it as the best compromise that could be reached between solubility and persistence and we still feel that way. Sulphisoxazole has assumed prominence in the human field because there is great pre-occupation there with renal toxicity and because frequency of dosage is of relatively little account. In short I regard sulphisoxazole as over-shooting the work we are aiming at, being unnecessarily soluble and hence losing out on persistence. And I think Dr. Scheidy may agree with me. Nor am I much impressed with the claims made for sulphisoxazole as the drug of choice for urinary infections in animals. How many gram-positive urinary infections susceptible to sulphonamide drugs have we to deal with in any case? And is it not true that the urine levels of many other sulphonamides are quite sufficient to give adequate therapeutic effects? I suggest, therefore, that sulphisoxazole has really nothing unique or very novel to offer in the veterinary field. I wonder if Dr. Scheidy agrees?

With regard to the second group of sulphonamides there has been, as most people know, trouble in this country during the last 18 months or so with toxic effects in poultry arising from the administration of sulphaquinoxaline. Much of the trouble has arisen from using this drug for the therapy of coccidiosis rather than for prophylaxis which is its main field in the U.S., but nevertheless it would be helpful if Dr. Scheidy could give us his views.

With regard to drugs for enterohepatitis in turkeys I want to make only two points. 2-amino-5-nitrothiazole and related compounds which were developed in the U.S. have given excellent results here. But it is an advantage sometimes to be able to give them in the drinking water. When I was in the States about two years ago, a solubilised form using polyethylene or polypropylene glycol was becoming available. Perhaps Dr. Scheidy can further enlighten us. And when I saw Dr. Swales in Canada shortly before his tragic and premature death he showed me spectacular results he was obtaining with cortisone in the therapy of blackhead. He was using doses of only 25 mg. per bird and cures were being effected despite the presence of widespread hepatic and other lesions. I mentioned Swales' observations in a "Recent Advances" paper elsewhere and I wonder whether there is any further information on this topic which Dr. Scheidy can give us.

Turning now to the antibiotics, I think it came as something of a shock to many of us to know that no less than 10 of these substances are now in use in the veterinary field in the U.S. We are still inclined, perhaps, to regard this group as penicillin and the rest, but obviously the day is coming when as wide a choice of antibiotics will be available to us as we now have with other groups of chemicals. Meanwhile it is remarkable that some 40 per cent. of all medical prescriptions in the U.S. now specify antibiotics and this proportion still tends to increase.

Despite all the newer antibiotic discoveries, and we should pay tribute to American inventiveness for them, penicillin still continues to be the subject of continuing research. It is still in many ways the most remarkable of all the antibiotics and I should like to comment briefly on two points regarding it which Dr. Scheidy has brought up. Firstly on the use of substances which compete in the renal tubular system with penicillin for elimination, and secondly on diamine penicillin In using agents such as para-aminohippuric acid or Benemid we are, as it were, muscling in for a short time on a normal physiological process. We had some doubts at one time as to the dangers of renal toxicity but with Benemid at least they seem very low. Nevertheless for veterinary usage at least one always feels a little nervous of interfering with renal excretion and personally I prefer other methods of prolonging penicillin effects. One of these is the use of the highly insoluble salt N-N′ dibenzylethylene-diamine dipenicillin G which we shall call diamine penicillin for short. This salt gives blood levels for up to a week following a single injection compared with six to eight hours for sodium or potassium penicillin and 48 to 72 hours for procaine penicillin. Certainly as Dr. Scheidy says there may be a danger that blood levels with it are rather low although this is unlikely to occur if adequate dosage is used and it can be avoided, of course, by adding sodium penicillin and procaine penicillin at the time of administration. It would be a considerable advantage in some veterinary uses to have a single injection of penicillin with such prolonged effects. Incidentally diamine penicillin is virtually tasteless. The fact that preparations of it for oral use have a pleasant flavour is due to the artifices of the pharmaceutical manufacturer, not, as Dr. Scheidy suggests, to any intrinsic palatability of diamine penicillin itself.

On the other antibiotics I have little just now to add. Neomycin, I think, may be of veterinary interest but it is rather expensive at the moment; polymyxin B was, of course, the great hope against whooping cough infection in man but one gets the impression that the early expectations for it have hardly been fulfilled; and erythromycetin is expensive to use because of the large doses required.

As Dr. Scheidy points out and as I have said elsewhere, polymixtures of antibiotics have to be viewed with some suspicion. Browning and others have pointed out the complexities of therapeutic interference and I am still simple enough to believe that a melage of three or more antibiotics plus a couple of sulphonamides thrown in for good measure is no substitute for an accurate diagnosis and the use of a single specific remedy. Certainly even on basic chemical grounds some of the extraordinary mixtures now available cannot be anything but unstable.

On hormones, I can say very little, our own interest having been confined lately to cortisone, ACTH and synthetic substances with similar pharmacological effects. I cannot quite see, however, from Dr. Scheidy's account why oestradiol cyclopentylate should be regarded as having much if anything in the way of practical advantage over diethylstilboestrol. Doubtless it has greater intrinsic activity but on chemical grounds it must be more expensive and presumably one can double up the dose of stilboestrol if required. I wonder if there are any grounds for its introduction which Dr. Scheidy can enlarge upon for us?

So far as cortisone and ACTH go I have already referred to Swales' work in enterohepatitis in turkeys and I want to support Dr. Scheidy in his views that these substances will find immediate application in bovine acetonaemia whenever they become available at an economic price. In a high majority of cases results with them are spectacular and very gratifying and for the first time they give the practitioner hope of dealing with this difficult disorder in a really satisfactory manner. Incidentally I have received a lot of information from the U.S. recently on the oral administration of large doses of sodium propionate in acetonaemia, using amounts of ½ to 1 lb. daily. Results seem to be very good and I am sure we would be interested to have any information from Dr. Scheidy on this point. Availability and price of cortisone and ACTH are, of course, of considerable moment to veterinarians. Costs are still falling steadily in the U.S. and the Syntex Organisation in Mexico has announced during the last few weeks yet another newer and cheaper method of manufacture using bacteria rather than synthetic chemists to do the work. And there is reason to believe that synthetic chemicals can be prepared which will act on ACTH which acts on the adrenal cortex which produces cortisone, so the future is complicated but fairly bright.

On enzymes I also propose to say very little. There are others here better equipped than I am to discuss this field. All I would say is that I am a little doubtful about the therapeutic efficiency of the proteolytic enzymes excellent as their use is in theory. Our medical colleagues are not really happy that their clinical value has been established in the various conditions mentioned by Dr. Scheidy, but doubtless others will wish to deal further with this matter. Hyaluronidase has, of course, proved valuable in our hands and I think that by and large we could

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use it more frequently, especially in infiltration local anaesthesia as is done in the States.

In the anaesthetics and analgesics section of Dr. Scheidy's paper methadone is of absorbing interest. Although it is not entirely devoid of morphine-like side effects it seems in general to be a better drug than morphine and it deserves wider veterinary evaluation. The information given by Dr. Scheidy on hexylcaine hydrochloride is also of great value. It is extraordinary how much work continues to be devoted to local anaesthetics despite the fact that some of the very early ones like procaine hydrochloride are pretty satisfactory drugs. Only last week I saw the announcement in the U.S. of a new series of highly active local anaesthetics, the 2-alkoxy-4-aminothiobenzoates, for which considerable claims are being made. In Britain, of course, xylocaine has received most prominence of late with its special features of high rapidity of action and long persistence. Perhaps Dr. Scheidy could tell us how hexylcaine compares with it.

Thialmylal is, of course, very close chemically to thialbarbitone or "Kemithal" which is quite widely used for anaesthesia in dogs in this country. I wonder whether Dr. Scheidy has had any experience in comparing the two substances.

On silicones I should just like to mention a third use which I think Dr. Scheidy has omitted and which may well be important, *i.e.*, the use of silicone ointments or creams to prevent maceration of the skin due to frequent immersion in water or other fluids, and scalding of the skin due to urine, exudates, etc. These preparations literally waterproof the skin and may be valuable for use on the arms of veterinarians, as well as on the animals themselves. Our own tests with them have been very promising and I understand that they have been available in the States for some time. Perhaps Dr. Scheidy can tell us whether he has had any experience with them.

On nitrofurazones I understand that there is a new compound now being made available for the treatment of urinary tract infections. It has been referred to in the *Journal of Urology* and is claimed to be active against gram-negative organisms so it might be of veterinary interest. Has Dr. Scheidy any information on it?

I am afraid that I cannot be very enthusiastic about colloidal silver oxide. Its use against calf scours, etc., seems to me to be rather highly speculative. We now have so many things of known and established activity that my own feeling is that we can well afford to leave it alone.

Last but not least important of the topics mentioned by Dr. Scheidy are the plasma extenders or plasma substitutes as we usually call them. These are, I think, generally much more used in America than here. We have had experience with dextran which was developed in Sweden, gelatine solutions and polyvinylpyrrolidone. All of these seem quite satisfactory for veterinary work. Perhaps the one which is potentially the most dangerous is polyvinylpyrrolidone both from the viewpoint of kidney blockage and side reactions, but in careful usage it seems to be quite safe. Gelatine solutions are perhaps best of all and most economical in usage although it is essential to use specially prepared gelatine of the correct molecular size. We could, I think, use plasma substitutes more widely than we do in place of saline or dextrose/saline therapy which is often unsatisfactory.

As I said I would, I have confined my remarks to the topics raised by Dr. Scheidy. I have been as critical as it has been possible to be. I have stressed any points of disagreement between us because I feel sure that that is what Dr. Scheidy and you would wish me to do. But really I have found little of a fundamental nature upon which we differ. American veterinary science takes to novelty more quickly than we do and perhaps is a little less critical in its assessment of new products. We often prefer to wait and see. This is a difference in our temperaments rather than in our basic intentions. On both sides of the Atlantic we are, I am sure, anxious only for the continued progress of veterinary medicine and the free exchange of information and opinions such as we are having to-day is assuredly the best way of serving the interests of the profession in both of our countries. (Applause.)

The Chairman: According to the time table I should now call upon Dr. Scheidy to reply to the discussion. That is obviously impossible and therefore I am going to exercise my prerogative as Chairman and postpone the closure of this meeting for half an hour. I have managed to persuade the President to defer the meeting of Council until 12.15. Will those who wish to participate in the discussion please in the circumstances be terse in making their contributions.

General Discussion

Mr. D. L. Hughes (Thurgarton): He wished, first of all, to congratulate the Provisional Committee on their choice of speaker on this very wide subject. They were right in thinking it was an American who would probably do the job best because it must be acknowledged that a great deal of the recent advances, especially those in chemotherapy, had come from the United States. For that reason, Dr. Scheidy was an excellent representative. Mr. Ogilvie was known to them all and had batted according to form.

The first thing which came to Mr. Hughes's mind was, in applying chemotherapeutic and antibiotic knowledge in the veterinary field one had to have a basis of veterinary research work before those two weapons could be used intelligently. That was certainly true of antibiotics. Penicillin was the first example and veterinary research had done a good job on penicillin. In this connection one needed a combination of laboratory studies followed up by pharmacological work and, finally, clinical observations. It should not be assumed that the information provided from medical research was automatically accurate in the field of veterinary work. It should not even be assumed that the results obtained in the veterinary bacteriological laboratory could be applied clinically.

In the early days there was a tendency to work out bacterial spectra and to say that in the test tube such-and-such an organism could be killed by such-and-such a concentration and when so many units of the antibacterial agent were given to the cow there would be so many units in the blood stream and therefore they must kill the organism. Unfortunately, it did not always turn out that way.

S. J. Edwards—his old friend at Compton—had shown quite recently that *in vitro* results were not always mirrored by *in vivo* results: he had shown this with a number of the antibiotics. Nowadays the antibiotics were coming along so quickly that there was a tendency to launch them in the veterinary field without an adequate research background and to launch them on transposed information from medicine. They ought, however, to go rather more slowly. The list of antibiotics, mentioned by Mr. Ogilvie, frightened him because even in the States a number of the newer antibiotics had no adequate background for veterinary use. It was a big job to investigate a new antibiotic in the veterinary field. It took as least 18 months hard work by two or three people, fully employed, to collect the essential information.

Although Mr. Ogilvie had given a reassurance, Mr. Hughes wanted to question what evidence there was that these substances which retarded the excretion of penicillin were without damage to the kidney. Was one safe in assuming that a dog with a damaged kidney due to leptospirosis infection, which was a case suitable for penicillin treatment, was suitable also for a penicillin retarding drug? Would there be no risk to such a damaged kidney?

On the matter of mixtures of antibacterial agents there was some information on compatibilities of antibiotics and it was known that certain mixtures were synergistic, while others were antagonistic. That was a broad statement of fact, but could it be assumed automatically that a particular case under treatment was suitable for a mixture which in theory was likely to be synergistic? The organism concerned might not respond as expected. The tendency to make mixtures of sulphonamides and antibiotics was dangerous, for in the veterinary field there was not enough information as yet to justify their widespread use.

The next problem which was obviously going to arise very soon was the use of cortisone in the veterinary field. There were promising indications that it might be useful for this, that, or the other condition; but a lot more basic information was wanted. We should know what cortisone did, for instance, in the normal cow before we started injecting it into the ketotic cow. It was said that it might have a place in treating arthritis, but the arthrites were heterogeneous, and cortisone would not work in all kinds of arthritis. Nothing was known at all about that as yet in animals.

Then there was the use of enzymes, particularly streptodornase and streptokinase as liquefiers of tissue debris. The speaker had used those two agents for summer mastitis, but from four or five cases it was difficult to say if they had really helped. Obviously, many more cases must be dealt with before the use of such adjuncts to treatment could be recommended.

As Mr. Ogilvie had said, it was a pity to start talking about things like colloidal silver and iodine preparations for injection into the bovine udder. It was no good saying, " We only put them in the dry udder," the dry udder, it was hoped, would one day function again. At this time, with the number of compounds which were promising in mastitis, it was a retrograde step to start injecting agents which undoubtedly irritated mammary tissue.

Dr. W. P. Blount (London): To what practical extent was sulphamethazine used in the control of fowl cholera and some of the Salmonella infections in poultry? Secondly, to what extent was the use of nitrofurazone related to the activity of the manufacturers or related to therapeutics? Did a practising veterinary surgeon in America take any opportunity to test the organisms for which he used his antibiotics against any particular antibiotic?

Miss O. Uvarov (Cobham, Surrey) in expressing her appreciation of the paper, remarked that not only was this a valuable contribution in itself but the authors had quoted an extensive bibliography for future reading. Miss Uvarov, owing to shortage of time, confined her remarks to discussion of (1) *Streptomycin*, (2) *Erythromycin* and (3) *Blood plasma substitutes*.

Streptomycin and Dihydrostreptomycin

In the family of antibiotics, streptomycin and its derivative, dihydrostreptomycin, were perhaps the least understood—at any rate in clinical use. From available information it appeared that in other countries, notably in the United States of America, streptomycin was much more widely used than here. Its possible neurotoxicity had rather overshadowed its selective virtues. The most important point to remember about streptomycin was that it must be used for *short and sharp* therapy. Its main use was for its bactericidal action; since its use had to be of short duration, it must be given in adequate doses. Apart from individual increased sensitivity, it appeared that its neurotoxicity had been encountered mostly in protracted cases of treatment, or in toxic cases, and alarming reports had minimised its uses. It was accepted that treatment with streptomycin should not as a rule be longer than four to six days.

Streptomycin was of value in the following conditions:—

(1) *B. coli infections*.—In this particular group the scouring syndrome in pigs and calves should be specially mentioned. Our oversea colleagues had been much more imaginative in this field than we had. They had contributed several publications on the use of streptomycin by the oral route for the enteritis syndrome in pigs and calves. This route imposed a local restriction to the action of streptomycin because 60 to 80 per cent. of the dose given by the mouth was excreted in the faeces; in this way risks involved in the possible future use of this antibiotic for any systemic condition were minimised. There were reports from Ontario (McKay & Rowsell, 1949) of streptomycin being used prophylactically for scours in calves on known infected premises. Dr. Scheidy mentioned a dose of 0·5 gramme streptomycin orally. She believed that the dose might be modified to suit the size and condition of the patient and particularly the frequency of peristalsis.

(2) *B. coli mastitis*.—Particularly resistant cases did well on streptomycin. In this connection it was well to mention that cases of mastitis in sows, due to *B. coli*, responded to streptomycin in *heavy* doses—3 to 5 grammes.

(3) *Sinusitis in Turkeys*.—By direct instillation, with or without withdrawal of sinus contents, streptomycin could be a specific. Its intramuscular use for this condition appeared to vary in efficacy. In some instances it had worked well and in others it had had little effect.

(4) *Urinary Tract Infections*.—Streptomycin was of value in cystitis and nephritis. *Leptospirosis* was one of the most common causes of canine nephritis and penicillin was advocated in the leptospiraemic phase; once the infecting organism had localised in the kidneys, however, it was claimed, at any rate by our American colleagues, that streptomycin must be used to clean up these potential carriers.

Certainly in canine cystitis due to *B. coli* or *Proteus* infection, streptomycin was of great value. In this connection, two points of interest arose. First, streptomycin was at its most active in an alkaline medium, so that in canine nephritis an alkalising agent might have to be employed; secondly, the frequency of administration was governed partly by the rate of micturition. In some cases of subacute canine nephritis, where thirst and urine flow were increased, the frequency of injection might have to be modified. It was also useless to expect streptomycin to cure terminal stages of nephritis, of whatever cause. In a number of urinary tract infections, streptomycin and penicillin had a combined effect greater than the sum of their separate effects, with excellent results.

(5) *Vibriosis*.—There were also many reports of the use of streptomycin for genital tract infections. Vibriosis, in particular, had in other countries been extensively treated by intra-uterine infusion. Cases of infertility, abortion or retained foetal membranes had all responded well to the treatment by intra-uterine instillation of streptomycin, sometimes supplemented by its parenteral use.

It was quite likely that without laboratory indentification of the causal organism, difficult to obtain in practice, streptomycin could never be used to its full advantage, but it must be remembered that the danger of temporary or permanent damage to the eighth cranial nerve, resulting in vestibular disfunction, was in direct ratio to the dose and duration of the streptomycin treatment. Where laboratory investigations had been correlated with clinical findings, streptomycin had been of great value.

Erythromycin (*J.A.V.M.A.*, 1953)

This latest arrival, on the basis of its *in vitro* activities and of a very few cases of use *in vivo*, was of interest. It was active against both gram-positive and gram-negative organisms, was alleged to be non-toxic even for long periods and was concentrated in the liver; these properties might open an interesting field of therapy. It might also be of practical importance that there was no cross-resistance developed between erythromycin and other antibiotics. It was stated that bacteria that had become resistant to penicillin showed no resistance to erythromycin. Its Therapeutic Index remained to be investigated.

Blood Plasma Substitutes

At the end of his paper, Dr. Scheidy had referred briefly to the use of blood plasma substitutes. In a dramatic syndrome like shock, transfusion therapy became an emergency measure. It was quite likely that transfusion had been somewhat neglected because the mechanism of shock had not been widely studied in veterinary medicine.

It was of interest to consider two definitions of shock to appreciate the required properties of plasma substitutes:—

(1) " Peripheral Circulatory Failure Resulting from Discrepancy in the Size of Vascular Bed and the Volume of Intravascular Fluid." (Minot & Blalok, 1940.)

(2) " Black's Veterinary Dictionary " (1953), on the other hand, defined shock as " The condition of collapse wihch may follow severe injury, surgical operation, extensive haemorrhage, and other conditions that produce a deep impression upon the nervous system."

Both definitions could be used to illustrate the use of plasma substitutes in the treatment and prevention of shock of any origin.

The main purpose of plasma substitutes was to increase the circulatory blood volume and hence these substitutes were often and more descriptively called " Blood Volume Expanders."

Dr. Scheidy had been far too modest in describing only two of such substances. A good deal of work had been done on the subject in Sweden, the United States of America, and this country, and the following classification of blood volume expanders could be suggested.

Classification:—

(1) From humans—(*a*) plasma; (*b*) serum; (*c*) serum albumin.

(2) Products from animals—(*a*) bovine plasma; (*b*) gelatine or oxygelatine.

(3) Products from plants—(*a*) gum arabic; (*b*) dextran.

(4) Synthetic chemicals—(*a*) polyvinyl pyrrolidone.

Gelatine and oxygelatine, as we knew them, might be troublesome to prepare. They could be completely viscous or gelled and then had to be warmed. Bovine plasma given to other species had produced in some cases some alarming reactions, such as urticaria, diarrhoea and vomiting. (Allan, 1947.)

Polyvinyl pyrrolidone was not suitable for canine use and could not be safely recommended since in Dr. Scheidy's experience it caused a " canine reaction " and cortisone was not available to counteract this phenomenon.

The " expander " now most commonly used for veterinary and human tranfusions was dextran; it was obtained by partial hydrolysis of the gum formed during the growth of organism *Leuconostoc mesenteroides* in a medium containing sucrose.

Dextran was a polysaccharide composed of glucose units joined by 1:6 glucoside links in a main chain with short branches. It was not rapidly broken down by the common carbohydrates in the body, thus providing one of the reasons why dextran remained in the circulation long enough to be of therapeutic value. Plasma expanders had to conform to certain criteria before they could be considered suitable (Penny, 1953), such as:—

(1) its osmotic pressure and viscosity must approximate to that of plasma,

(2) it must be capable of increasing the blood pressure and circulatory volume and of maintaining them until the body recovers from shock,

(3) it must be capable, if blood loss is extensive, of supporting the circulation until whole blood transfusion is available.

(4) its molecular weight must approximate to that of plasma,

(5) it should not remain in the body for more than a few days after administration,

(6) it must be sterile, uniform, stable and easily administered.

It was, of course, understood that blood volume expanders were not substitutes for whole blood. Their main functions were:—

(*a*) to restore colloid osmotic pressure and

(*b*) to maintain circulatory volume, and so

(*c*) to allow time for the patient's own plasma proteins to be restored.

Their uses were indicated:—

(1) in the treatment of shock, *e.g.*, haemorrhage, injury, burns;

(2) before and during surgical operations and post-operatively if shock, haemorrhage or a state of anoxaemia exist;

(3) supportive therapy.

There was thus a variety of conditions in which therapy could be supplemented by the use of a blood volume expander.

Wherever shock and/or dehydration could result, circulatory volume could be maintained by a transfusion. For instance, diseases presenting the symptoms of:—

(1) dehydration, *e.g.*, vomiting, enteritis, scours;

(2) circulatory imbalance, *e.g.*, pleurisy, peritonitis;

(3) toxic symptoms, *e.g.*, some types of endometritis;

(4) haemolytic diseases, *e.g.*, red water in cattle.

In the last condition, haemodilution must be avoided, but blood volume expanders might be used to maintain the circulatory volume and to avoid shock until such time as whole blood could be available.

Our overseas colleagues had stated that plasma expanders could be placed in the following order of merit:—

(1) Dextran (Morrison & Lundy, 1952; Hampden & Lawsen, 1943; Amspacher & Gray, 1952; Bollman & Knutson, 1951; Craig *et al.*, 1951).

(2) Plasmoid.

(3) Oxypolygelatine.

This rating was based on the ability of the products to maintain blood volume and on their rate of excretion into the urine.

The introduction to his paper by Dr. Scheidy of blood volume expanders was an indication that the problem of shock, which was of concern to the anaesthetist, the surgeon and the clinician, could now be tackled by transfusion therapy.

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Mr. Neil Mathieson: Dr. Scheidy and Mr. Ogilvie had both made reference to the importance of using a prolonged acting form of penicillin, in particular, benzethacil, from the economic point of view, but he would emphasise the fact that penicillin, when correctly used, was essentially bactericidal in action and consequently emphasise the necessity of achieving initial high blood and tissue levels by the use of crystalline sodium penicillin G; this was particularly the case if one was dealing with an acute infection, or if the organism was not particularly sensitive to the action of penicillin. However, there were many cases where the use of a prolonged acting penicillin was indicated. At Greenford, they had been working with a new salt of penicillin, benethamine penicillin, and the results in clinical trials had been most promising. With benethamine penicillin, one was able to maintain demonstrably significant blood levels for 120 hours, while at the same time achieving higher initial levels than was possible with benzethacil. It thus became a practical proposition in the field to use a single injection, knowing that adequate coverage would be given for five days—a question of considerable economic importance. He must point out, however, that this form of penicillin was still undergoing clinical trials and would not be available commercially until those trials had been completed, probably about the end of this year.

The Chairman: Before asking Dr. Scheidy to reply, he wished to say one thing. Mr. Ogilvie referred to a difference of opinion with Dr. Scheidy regarding infections in the alimentary tract being in the same category as the other types of infection with which they had been dealing. He himself was ranged absolutely with Dr. Scheidy. If there was one general conclusion to be drawn from Dr. Scheidy's paper it appeared to be that veterinary practitioners who some years ago attacked diseases from the outside of the animal—"outside" might be in the alimentary tract or the respiratory tract, and so on, but it was nevertheless outside the real animal—must now think of disease not merely systemically but in relation to its state in the tissue cells. They were now coming down to combating disease in the tissues and cells. Most of the agents that had been discussed had their therapeutic effect in all probability within the cells themselves.

The Reply

Dr. Scheidy, in reply: First he wanted to thank Mr. Ogilvie for letting him know how he had come to be invited: he had no idea that he was playing second fiddle to anyone. (Laughter.) The questions that had been raised were sincerely appreciated. It was obvious that some of his statements had perhaps been misunderstood. In attempting to relate what was being done in the United States the impression might be given that some methods of treatment were not too well founded, but there had been a practical application for most of the agents dealt with.

With regard to the points raised by Mr. Ogilvie, he would agree with what had been said about the systemic and intestinal sulphonamides but believed it well to treat the reservoir of infection. Where it was in the bowel certain agents were used to reduce the number of organisms, and thus the reservoir of infection.

The only justification for mixtures of sulphonamides now was related to cost. A few years ago, when the safe and more effective individual drugs were not available, mixtures were important. They saved life and reduced renal toxicity. As the new agents could now be obtained, he would agree with Mr. Ogilvie, unless cost was a determining factor.

Reference had been made to reactions in various species of animals. That point was made when referring to studies with chemotherapeutic agents in different species. It was realised that differences existed, and different reactions must be assessed so that the agents might be used wisely.

It was interesting to hear that in Britain doses of sulphapyrimidines were somewhat higher than in America. Presumably the dosage schedules used in the States were determined early and were kept at a minimum because of cost, and since satisfactory responses were apparently obtained with a lower dosage there appeared to be no good reason for giving more of the drug.

Sulphaquinoxaline was used extensively as a prophylactic agent in coccidiosis and not as a therapeutic agent. It was a pity that not more work had been done in other species with this drug. There had been only a few studies and they were recorded in the literature. Originally sulphaquinoxaline was considered rather a dangerous drug, but when it was found that it could be used prophylactically in small doses, it became popular in the control of coccidiosis.

He had no information regarding the preparation of solutions of 2-amino-5-nitrothiazole, nor any further information regarding cortisone and that agent for management of blackhead in turkeys.

A question was raised regarding "Benemid" in relation to an increase of blood levels of penicillin. This agent had been studied in patients with kidney damage and there was apparently no evidence that this compound would further injure renal tissues. It should be pointed out that if extensive renal damage were present the dose necessary to obtain higher levels of penicillin

was smaller. As regards the effect it might have on leptospirosis, he was not aware that " Benemid " and penicillin had been used for the treatment of this disease, but assumed that " Benemid " would not further injure the kidneys.

On the question of mixed antibiotics, he did not think that the veterinarians he knew were using mixtures because of improper diagnosis, but rather to treat mixed infections. Mixtures of penicillin and streptomycin were being used particularly. Fortunately, synergistic and antagonistic reactions could be demonstrated with only certain strains of organisms.

With regard to the management of acetonaemia in cattle, cortisone had been useful in the treatment of some cases. True, it was costly and many animals did not warrant the expense of the agent. Sodium propionate was used to some extent, but was not as popular as it had been a year previously. More effective and cheaper agents were still being sought.

The general view regarding the enzymes was that they were useful agents. Another use for silicones as pointed out by Mr. Ogilvie was appreciated.

Mention had been made of silver preparations and iodine, and he would not spend much time to defend them since there were other agents equally effective or superior for bovine mastitis. Mr. Hughes had done a good thing in stressing that laboratory data could not always be carried forward into the clinical field and there was need for further study of these new agents. More extensive studies were required with various species of animals in order to get the fundamental information needed for the use of the chemotherapeutic agents. It had been said in the discussion that there should be further investigation into the use of cortisone, and that was quite true. He himself was greatly concerned about the lip service paid to cortisone in connection with arthritis. While groping for more information about effective therapy some investigators had taken the opportunity of injecting cortisone into animals and a response had been found. A number of horses and dogs had been treated with some response, but the understanding of arthritis in animals was very poor. One was inclined to think that the understanding in the human field was not too clear!

Mr. Blount had asked a question regarding sulphamethazine in fowl cholera; it was used to a limited extent, but the disease presented serious problems because of the carrier bird and subsequent re-establishment of the infection. There was some evidence that nitrofurazone was an effective agent according to laboratory and clinical studies.

It was difficult to see how practising veterinarians could make sensitivity tests of the chemotherapeutic agents in their practices in the same way that tests were being conducted in human hospitals. It was desirable, but there appeared to be no way of accomplishing it at the moment. The veterinarian must act on the information available and provide treatment for animal patients.

Miss Uvarov's remarks were most welcome and he thanked her for them. Her comments regarding streptomycin in enteric infections, and especially the oral use of the compound, were welcomed. Since the price had been reduced, streptomycin was more extensively used. The dosage adjustments were made generally in an upward direction. He had never used doses that produced toxicity, as had been reported in human patients. A few cases of toxicity in the smaller animals were reported. They were possibly due to negligence on the part of the clinician who was giving too much streptomycin so that over a period of time a disturbance developed. That might occur in small cats and very small dogs receiving perhaps 1 gramme a day for a week or so. Mr. Mathieson's remarks relating to penicillin therapy were appreciated.

Dr. Scheidy concluded by saying that he hoped he had answered the questions raised and if his points were not clear he would endeavour to amplify them further. Again he wished sincerely to express his appreciation for being able to join the Congress and for the opportunity to be in Aberdeen. (Applause.)

The CHAIRMAN: Although he was duty bound to propose a vote of thanks to Dr. Scheidy, the meeting had already rightly forestalled him and shown their gratitude by spontaneous applause. They were indeed grateful for Dr. Scheidy's able exposition of a difficult subject matter and for arranging it so that they could enjoy, as they had done, a first-class discussion. (Applause.)

Another vote of thanks was due. Owing to the work of the Provisional Committee and others responsible, it had been a pleasure to be in the chair, just as it had been a pleasure for all of them to participate in the meeting. The speakers were clearly heard no matter from which part of the room they spoke. The meeting therefore wished to express its thanks to the Provisional Committee for making such adequate arrangements. (Applause.)

CLINICAL COMMUNICATION

SAND IN THE ABOMASUM OF A GUERNSEY COW

E. F. LEWIS AND H. BURROW

DEPARTMENT OF MEDICINE, ROYAL VETERINARY COLLEGE

Because this case presented some unusual features and illustrated the difficulties in diagnosing disorders of the abomasum of cattle, it was felt that a brief description might be of interest to readers.

The subject was a four-year-old pedigree Guernsey cow which had been bred and reared in an attested herd. The animal was pregnant for the second time when acquired by the department and had been culled from the herd because of its poor condition and failure to produce a satisfactory quantity of milk following its first, normal calving. Before leaving the farm, however, the cow had been subjected over several months to clinical and laboratory examinations for the chronic wasting diseases, but all tests had proved negative. The animal was then sent to the Medicine Unit at Streatley.

The clinical appearance at first was that of an animal in rather lean condition without any other physiological abnormality being evident. A single intradermal tuberculin test with mammalian tuberculin showed no reaction. A complement fixation test for Johne's disease was carried out with negative result and faeces examination both microscopically and culturally showed no evidence of Johne's infection. Examination for evidence of parasitic infestation was carried out periodically with similar negative results. Chemical analysis of blood samples gave figures which were within the normal range for calcium, magnesium, inorganic phosphate and sugar content. A Rose-Bengal liver function test was also carried out in the hope that some degree of liver destruction would be demonstrated. As far as such a test could be interpreted the liver appeared normal.

The animal was allowed to graze with others at pasture and although occasionally bullied by its fellows, fed and drank normally for four months until it calved unaided in the field. During this period there appeared to be no further loss of condition but despite concentrated food supplements it began to show progressive wasting during the two months following parturition. The quantity of milk secreted was meagre but sufficient for the small heifer calf which had been produced. The abdomen, however, always appeared full and palpation of the rumen indicated a fairly normal food and water intake.

A degree of emaciation was finally reached which made euthanasia the only course.

Post-mortem examination: The primary midline incision into the abdomen in the xiphi-sternal region revealed a distended organ which at first was thought to be the rumen. When this was incised, however, a large quantity of grey fluid escaped and the organ was seen to be the abomasum. It was approximately the same size as a normal rumen, the weight of its contents having brought it down to the floor of the abdomen. The grey fluid proved to be a mixture of watery food material and sand. The mucosal folds were packed with sand to a depth of approximately 2 inches but when washed free, appeared normal. There was no apparent thickening of the wall despite the gross distension. The rumen, reticulum and omasum were normal in size but the contents were drier than usual due to the dehydrated state of the animal before death. There appeared to be no abnormality of the oesophageal groove and the rest of the carcase presented only those pathological changes compatible with marked cachexia.

The illustrations show the animal immediately before slaughter (Fig. 1), the abomasal mucosa covered with sand (Fig. 2), the mucosa washed free of sand (Fig. 3), and a pile of sand weighing 10 lb. (Fig. 4) which was recovered from the residual material in the abomasum. A far greater quantity was unfortunately lost when the organ was first incised.

Fig. 1.

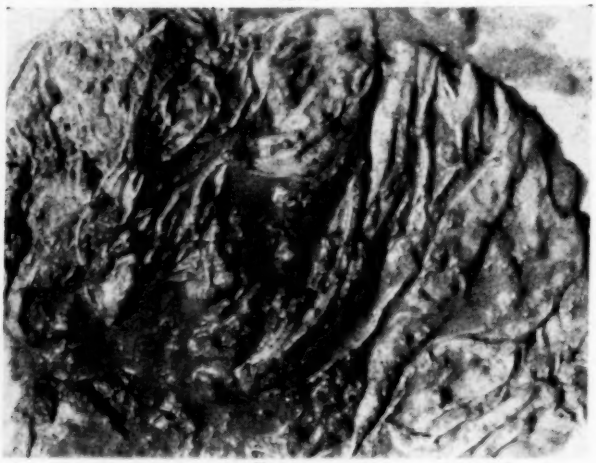

Fig. 2.

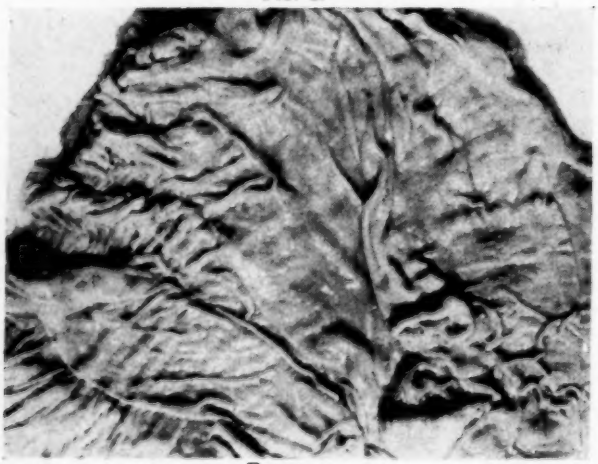

Fig. 3.

Fig. 4.

The farm from which this animal came is situated on sandy soil but as far as can be ascertained no other animal had ever shown similar trouble. At no stage did the cow show signs of pica and it has not proved possible to find any reason why sand reached the abomasum in such quantities.

A point of particular interest is the fact that such a large quantity of sand could accumulate in the abomasum and cover the mucous membrane so completely over an extended period without giving rise to any apparent inflammatory reaction.

Acknowledgments.—The writers wish to acknowledge the co-operation afforded by Mr. J. W. H. Holmes, M.R.C.V.S., D.V.S.M., and his staff at the R.V.C. Clinical Department, Wallingford.

LEVERHULME RESEARCH AWARDS, 1954

Application is invited for fellowships and grants in aid of research. These awards are intended for senior workers of established position and are limited to British-born subjects normally resident in the United Kingdom; in exceptional circumstances the trustees may waive the condition as to residence. No subject of enquiry is excluded from consideration, but preference is given to subjects in which existing provision is inadequate. Forms of application may be obtained from the Secretary, Miss M. Branney, Leverhulme Research Awards, 3-5, Salisbury Square, London, E.C.4. Applications must be received on or before December 31st, 1953.

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UFAW CHRISTMAS WARES

The Universities Federation for Animal Welfare deserves well of its friends and, at Christmas, its customers for the many pleasing items it supplies at modest prices, yet eminently suitable for presents. This year the sets of Christmas cards, particularly, combine good taste with humour, and the excusable touch of seasonable sentiment extends to the decoration of other serviceable lines, such as gift parcel labels, wrapping paper and ribbon. Order forms, attached to which is UFAW's annual general knowledge competition folder, may be obtained from 284, Regent's Park Road, Finchley, London, N.3, as may copies of an admirable new little gift book. This is " Both Small and Great Beasts " by Rosalind Hill, M.A., B.LITT., with 19 illustrations by Fougasse, price 2s. 6d., post free; it is suitable, moreover, for " both young and old " readers.

* * * * *

The Metropolitan Counties Branch of the British Medical Association in January of this year held a very successful Centenary Ball, the proceeds of which were divided among the medical charities. The Branch has decided to hold another Charities Ball and preliminary arrangements are now being made for the ball to be held on Thursday, May 6th, 1954, at B.M.A. House.

ABSTRACTS

Proceedings of the Section of Veterinary Hygiene, R.S.I. Congress, 1953*

Presidential Address

The Presidential Address was given by Professor J. McCunn, of the Royal Veterinary College. Disease was the greatest enemy of living things, with dirt, filth, ignorance, neglect and malnutrition as its handmaidens. Disturbance of the ecological balance sets the forces on one side at immediate hazard. There have always been those who give attention to the sick and ailing. That is how doctors and veterinary surgeons originated, but later the work became specialised and we have doctors for man and doctors for animals. The first physician of known record was I. Em. Hetep—"The bringer of peace"—after whom is named the pyramid at Sakhara, near Memphis. He studied diseases in man and animals, and a hospital for man and animals was founded in India by the Buddhist King, Asoka, in 252 B.C. Early physicians had a broad outlook, their psychology being founded on mystery or magic, leavened by the balm of a belief in divine providence. Medical teaching for centuries followed Galen (A.D. 131), Hippocrates (460 B.C.), and Herodotus (500 B.C.). It was in the 16th century that Andreas Vesalius (1514–65), a Flemish anatomist, was able to discount much of Galen's teaching, and the way was open for Harvey, Realdo Colombo, Van Leeuenhoek and Pasteur.

The public health service is like an army in the field of which the M.O.H. is Commander-in-Chief, his divisional and corps commanders being represented by his staff of doctors, veterinary surgeons, nurses, sanitary, welfare and other officers. As troops we have dustmen, roadsweepers, sewermen, etc.

Food-producing animals convert the products of the field into valuable protein food for man. The veterinary surgeon is the only man competent to supervise the process of translating food from the field to the table. Individual parts in the process can be undertaken by men and women of a more limited training.

As for central slaughtering, we must not forget the master-butcher craftsman who selected his own beast, did his own slaughtering, and took a great pride in his craft, just as any artist did. If central slaughter has come to stay could we not make one or two exceptions in favour of these private craftsmen?

Tuberculin Testing in Relation to the National Dairy Herd

Mr. H. Birkett Allan, M.R.C.V.S., D.V.S.M., F.R.SAN.I., Superintending Veterinary Officer, Animal Health Division, Ministry of Agriculture and Fisheries, in his paper on the above subject, said that the aim is to eradicate bovine tuberculosis from our dairy herds. In attested herds, minor ailments tend to vanish and the health of the herd improves all round. The owner benefits from this, from the bonus of milk sales, and from the enhanced value of the attested stock. The scheme started in 1935, and in 1940 there were 16,000 attested herds in Britain. By September, 1952, the figure was 90,000 herds, or 36 per cent. of the total cattle population. Divided into countries: England 30·5 per cent., Scotland 54·7 per cent., and Wales 57·5 per cent. Eradication areas have been declared in parts of South-West Scotland and South Wales, and many shows have special classes for attested cattle. Smithfield show accepts none other. Denmark celebrated the eradication of tuberculosis from her herds in 1952. They started work in 1934. We will attain our object in a reasonable number of years.

Professor Burrow paid tribute to the pioneer work of Birmingham in tuberculosis eradication, under Major DeVine. He thought the Attested Herd Scheme could not claim much credit for decrease in illness amongst cattle. That was due in great measure to sanitary officers improving the housing of cattle. He pressed for research into vaccination against tuberculosis.

Councillor Bennie, Stirling, pleaded for an easing of the burden of changes to byres, so long as the milk was clean and up to standard. Mr. Hastie thought the South of England beef herd men were the hard core of resistance.

Mr. Allan replied, endorsing the tribute to Major DeVine. No doubt better housing helped, but so did attestation, and as it covered the country, the reactor problem would cease to exist. At present eradication was the policy, then would come preservation from re-infection by vaccination.

The Abattoir Laboratory

Mr. E. F. Lewis, M.R.C.V.S., F.R.SAN.I., Lecturer in Medicine, Royal Veterinary College, in his paper, asserted that correct diagnosis is a fundamental principle determining the action of the scientific investigator. Advances in scientific knowledge make a laboratory essential. A plan and layout was suggested, with lecture or demonstration room having access to condemned meat room if possible. Bacteriological examinations and chemical tests could be carried out. The supply of raw material for research is immense in our abattoirs. Neither the veterinary surgeon nor the sanitary inspector is competent to carry out meat inspection on scientific lines without further training, but of the two the veterinary surgeon by virtue of longer tuition is best equipped for post-graduate training.

Mr. C. G. Allen, Birmingham, pointed out how various Government committees have recommended laboratories for abattoirs. Birmingham laboratory was used not only for meat inspection but also for the examination of suspected tuberculous milk and sputum from city herds. He stressed particularly the need for laboratory examination in emergency slaughtered animals. Mr. Bottom, Sanitary Inspector, Cambridge, welcomed the paper and mentioned how his colleagues kept records of diseases. The cost of fitting a laboratory was a factor. He thought some small abattoirs sold the best meat.

Mr. Bennie, Stirling C.C., contended that a central abattoir and a laboratory were necessary. Mr. Gregory Squire hoped the Institute would support the meat trade in insisting upon greater use being made of the knowledge of those in the meat industry. Professor Robertson suggested that a more comprehensive food hygiene syllabus in the Diploma in Veterinary State Medicine would help provide trained professional men for the posts. So also would a modified examination of the Institute for inspector of meat and other foods. Mr. Bywater thought a good many simple laboratory procedures could be carried out in small centres. The final examination of the R.C.V.S. catered for meat inspection and laboratory methods.

Mr. Lewis dealt with the matters raised and reminded members that facilities as advocated by him were in use at Edinburgh abattoirs.

D. J. A.

* **Proceedings of Section "D," Veterinary Hygiene, Royal Sanitary Institute Congress, April-May, 1953.** *J. Roy. San. Inst.* **73.** 1953; pp. 381-404.

Intervertebral Disc Protrusions in the Dog*

In these papers the author reviews all aspects of the subject with the exception of that of treatment. His own experience is based on 46 clinical cases of disc protrusion, and on the examination of 130 spines from routine autopsies of dogs showing no symptoms of the condition. There is considerable reference to, and comparison with, the papers of other authors on this subject.

Examination of dogs at the New York State Veterinary College indicated a clinical incidence of 0·7 per cent., whereas the routine autopsy examinations showed protrusion of discs in 41·5 per cent. of the dogs. In the clinical cases the highest incidence was in three-year-old dogs but in the autopsy material the highest number of protrusions was found in old dogs.

With regard to breed incidence, the author would include the Spaniel within the so-called chondrodystrophoid group of Hansen (Dachshunds, French Bulldogs and Pekinese). He agrees with Hansen in suggesting that in these breeds there is a metaplasia of disc substance to a cartilaginous form at a relatively early age, and that this predisposes to the high incidence of disc protrusions met in these dogs, whereas in other breeds the predisposing factor is a senile dehydration and degeneration of the disc.

The macroscopic and microscopic pathological appearance of these lesions of the spinal cord and surrounding tissues is described, and there is a brief reference to experimental work which, it is claimed, indicates that the extradural deposit seen in recent cases of such spinal injury may be due to the presence of the nuclear substance of the intervertebral disc and not necessarily to trauma.

The clinical picture as seen in dogs is described and the symptoms collected under four headings : (1) pain, (2) paresis and/or inco-ordination, (3) paraplegia, and (4) progressive ascending paralysis.

The author discusses the employment of neurological examination as an aid to diagnosis, and, while admitting that it may be difficult to evaluate in the dog, claims that abnormal response to stimulation of the various nervous reflexes may give some guide to the site of a disc lesion in an affected dog. In addition, he points out that while blood, urine and spinal fluid analyses are likely to show little variation in cases of protrusion of the intervertebral disc, they may be of value in differential diagnosis in indicating certain other spinal conditions.

The concluding section deals principally with contrast myelography, but the author stresses that this should be employed only in those cases (in his experience 63 per cent.) where normal X-ray negatives fail to show the lesion. Both thorotrast and pantopaque were employed as contrast media, but the former was abandoned on account of its toxicity and in favour of the advantages of pantopaque—which are listed. The reasons for subarachnoid introduction of the contrast media in preference to epidural injection are given. The introduction may be carried out by cisternal puncture, or a technique is described for the subarachnoid introduction of radio-opaque materials between the lumbar vertebrae. The author claims both good and bad results by this latter method.

In conclusion it is stressed that diagnosis should be based on an examination of all the evidence—clinical symptoms, neurological examination, normal X-ray negatives and, where necessary, myelographical examination. Mention is made of cases of disc protrusion having been confirmed in one cat and one rabbit.

S. W. D.

* **Intervertebral Disc Protrusions in the Dog : (1) Incidence and Pathological Lesions ; (2) Symptomatology and Clinical Diagnosis ; (3) Radiological Diagnosis.** Hoerlein, B. F. (1953). *Amer. J. vet. Res.* **14.** 260-283.

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Research on the More Potent Analgesics*

In a summary without much detail, an account is given of experiments with morphine, Eukodal, Dilaudid, Polamidon [Amidon, Methadone], and Dolantin [Pethidine] in pigs, dogs, cats, laboratory animals and occasionally in horses and cattle. Generally all these drugs in moderate doses have a sedative effect in all species and an excitant effect in large doses, so that it would be a bad mistake to try to obtain a better sedation by adding to one dose already given. Morphine has a narrower zone of sedative action than the other drugs. Polamidon has a good sedative action in cats and swine at a dose of 2 to 2·5 mg. per kg., and in horses and cattle at 0·02 mg. per kg.

These analgesic drugs work well with short-acting barbiturates and enable the effective dosage of the latter to be reduced markedly.

They stimulate the parasympathetic, and depress the sympathetic nervous system. Polamidon and Dolantin, but not morphine, block nervous impulses passing through the peripheral nerve ganglia.

All the above drugs except Dolantin tend to cause vomiting and all without exception delay the passage of food through the stomach, by causing pyloric spasm, and through the small intestine, except in the dog. Dolantin is spasmolytic to smooth muscle and morphine irritant, and Polamidon slightly relaxing in action. However, the effects are very complex.

J. T. E.

* **Research on the More Potent Analgesics** (Trans. title). Völker, R. (1953). Proc. Pt. I. Int. Vet. Congr., Stockholm.

REVIEW

[British Pharmacopoeia, 1953. Pp. xxiv + 894. Published for the General Medical Council by the Pharmaceutical Press, 17, Bloomsbury Square, London, W.C.1. Price 50s.]

The new eighth edition of the " British Pharmacopoeia " shows many changes in content and form from the previous edition of 1948 and all can be considered as improvements.

Perhaps the outstanding innovation is the use of English instead of Latin in the titles of monographs, although the change is tempered by the printing of the Latin equivalent as a sub-title. New monographs, however, appear without any Latin subsidiary title which would indicate that eventually the use of Latin will lapse altogether. Small but definite alterations in the making of the book, such as in the binding and type face and in the diagrams, all add up to improve the general appearance and elegance of this new edition.

In its compilation the British Pharmacopoeia Commission have drawn on the special knowledge of 10 expert committees as well as numerous individuals in order to review and amend the various monographs and appendices. More than 60 new monographs make their appearance, while more than twice this number have been deleted. For example, some of the drugs of vegetable origin, such as columba and capsicum, have been eclipsed and the older antiseptics like acriflavine and iodoform make way for new compounds of greater efficiency. The additions and deletions, of course, reflect new knowledge and the refinement of preparation ; for example, post pituitary extract is replaced as an injection by two of its components, vasopressin and oxytocin. The new antibiotics,

REPORT

[**Grassland Research Institute**: Experiments in Progress. (1953). No. 6. Cambrian News (Aberystwyth), Ltd. Price 5s.]

The Grassland Research Station is at Drayton, Stratford-on-Avon, but a move is in progress to Hurley, Berks, where an area of approximately 500 acres has been taken over as the site for a new station. From 1949 it has been administered by a governing body of 13 members appointed by the Minister of Agriculture, and the Secretary of State for Scotland in conjunction with the Agriculture Research Council. The Director is William Davies, D.Sc.

The sixth annual brochure of "Experiments in Progress" is a condensed publication of current activities, and within 91 pages 82 experiments are outlined; 38 tables are also included. The last page is taken up with a list of publications from the station during 1952; in a prefatory note the Director sets out the aims and explains the work of the station.

The work is concerned with the production of the grass ley in relation to treatment, the animal, and soil fertility: the aim is to extend the grazing season and to produce high quality pasturage throughout the year. Five technical departments have been set up: Herbage, Animal, and Ley Agronomy, Biochemistry and Animal Nutrition, Plant Physiology.

Herbage Agronomy covers the study of various species and strains, in regard to yield and seed production under different systems of manuring and management (the leafy strains are shy seed producers). This preliminary work is mostly restricted to small plots before any promising material is handed over to the more extended test by the Animal Agronomist.

Ley Agronomy is concerned with the effect of the sward on the soil itself and the varying factors associated with increased soil fertility that generally follow the introduction of the grass ley into an arable rotation. These include root development, influence on soil structure, and water stable aggregates. Within the greenhouse and laboratory microbiological studies deal with the influence of microflora on the growth and development of herbage plants and include interaction between plant host and artificial infection.

The department of Plant Physiology pursues its activities in field, laboratory and greenhouse and, together with the section of Biochemistry, undertakes routine analysis for the three Agronomy departments. It is mainly concerned with growth, reproduction and plant nutrition. Present trace element investigations are concerned with the levels of boron and molybdenum in timothy and Yorkshire fog (*Holcus lanatus*). The absence of visual symptoms of deficiency is noted. In earlier work on zinc, manganese and copper, characteristic deficiency symptoms were induced. Distribution throughout the year of various nutrient materials is also studied.

The department of Animal Agronomy studies the yields of swards in terms of live-weight gain and carcase quality of cattle, sheep and pigs; egg production and live-weight increase of poultry. Improvements are sought upon the present technique of extracting leaf protein for pigs and poultry feeding. Experimental layouts provide contrasting seed mixtures and varying applications of nitrogen.

Throughout the whole series of experiments in progress, much attention is given to the effects of nitrogen. Heavy applications in early spring influence summer yields by depressing the clover in the sward; summer nitrogen may depress clover seriously: these are tentative conclusions. The value in producing an "early bite" is emphasised. The present series of experiments may produce more evidence upon the influence of nitrogen applications in terms of beef cattle; dairy stock have not yet been included.

The results from various outwintering treatments of stock and the effects of differential winter feeding upon subsequent animal live-weight increase in the summer period are both experiments that attract attention. The importance of earlier treatments in their subsequent relation to health and disorders of animals cannot be overlooked: much more information is required on this aspect.

Studies on permanent grassland appear limited to botanical composition and live-weight production, using (1) varying applications of superphosphate; (2) different grazing systems and classes of stock; (3) heavy cultivations followed by seeds broadcast.

The farming practice of including old with new pastures is largely empirical; it remains an important aspect that requires considerable investigation, particularly in relation to the younger age groups.

The relative frost resistance of the various grass species features in the provision of suitable herbage or foggage for winter grazing, and wastage from poaching has been limited by drilling the grasses in rows 2 feet apart. The further inclusion of lucerne inter-spaced between the rows is intended for summer grazing.

Weighings after varying periods of fasting are necessary to determine true live-weight increase and considerable attention has been given to live-weight variation caused by the actual weight of rumen content. Studies of grazing behaviour have been undertaken in an attempt to determine suitable times for weighing when this factor can be reduced to a minimum. Previous observations have shown a pattern of grazing related to sunrise, so that rumen fill may be higher at midday during summer than at spring or autumn. Further differences associated with strip and rotational grazing are of practical interest. In conjunction with the Medical Research Council portable equipment is being devised to record the major movements of bullocks at pasture.

The department of Animal Nutrition and Biochemistry concentrates on fundamental problems, which include an investigation of errors that have been detected, both in accepted methods for estimation of chemical composition of herbage and faeces, and among techniques for assessing digestibility. Greater attention is devoted to fibre, in which improved techniques of chromatography are employed for detecting the various fractions; the digestibility of these fractions by the ruminant is then studied, and this is certainly a forward step in the study of the carbohydrate of grass, particularly the non-water soluble fraction.

This preliminary investigation is associated with the further problem of attempting the estimation of true nutritive value of herbage without resort to animal feeding experiments, and the necessity for accurate data on composition and digestibility is apparent before correlations can be established. Data from different workers cannot be accepted if techniques have been modified. The Director stresses the importance of defining fixed conditions under which the Standard Digestibility of a grass feed should be determined.

Possible correlation between the feeding value of herbage

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such as aureomycin, streptomycin and chloramphenicol, many new chemo-therapeutic agents—we may instance the antihistaminics—as well as many biologics, now appear as official preparations.

This new edition of the "British Pharmacopoeia" is an excellent achievement upon which all concerned in its preparation deserve congratulation, for they have more than maintained the very high standard set by previous editions.

and the chemical composition of resulting faeces is studied ; this, if established, would eliminate any previous differences obtained from feeding cut samples that might not be representative of the selective grazing by the animal.

Digestibility is affected by many factors apart from disease, and this department continues investigation into age, level of feeding, and on different breeds of sheep. Table XXXV sets out factors for correlating digestibility data from lambs and older sheep with a Standard Yearling Sheep (ability to digest herbage increases with age up to three years : older sheep were not introduced into the trials). The influence of varying levels of parasitism on digestibility is being studied at present. The method of cutting herbage, weighing into feed lots, and then storing at low temperature for feeding at a later date is designed to study any possible variation within the animal of ability to digest the same food at different times of the year.

Measuring herbage and crop yields presents statistical problems associated with sampling, randomisation, and replication : the introduction of the animal adds further variables. Bullocks and sheep capable of large weight increases over a period must assist in limiting variability. However much pregnancy and lactation may further confound, the extension of this work to dairy stock will be awaited with interest. The associated problems remain.

This appears to be an opportunity for congratulating the Director and his team of workers on " Experiments in Progress," which have continued despite the process of transfer—no mean feat of organisation. D. T. M.

IN PARLIAMENT

Protection of Animals (Amendment) Bill

LORDS DEBATE ON SECOND READING OF B.V.A.-SPONSORED MEASURE
PROPOSED EXTENSION OF SURGICAL ANAESTHESIA AND SELECTIVE DISCRETION FOR VETERINARY SURGEONS

As recorded in our last issue, the Protection of Animals (Amendment) Bill, which is the first sponsored in Parliament by the British Veterinary Association, received a Second Reading in the House of Lords on October 27th.

The effect of this Bill is to provide that all surgical operations upon animals (with a few specific minor exceptions) shall be carried out under the influence of anaesthetics, it being left to the veterinary surgeon to decide what agent he will use, and how it shall be administered.

Lord STAMP, in introducing the Bill, said that although the Bill could not make any further progress during the present Session of Parliament, he believed there were many advantages to be gained by discussing at the present time the general objects of the Bill and the reasons why it was considered necessary. In the first place, he entertained the hope that it might be possible so to enlist the support and sympathy of Her Majesty's Government that, in spite of the demands on their time, they would be prepared to reintroduce it as a Government measure—a course which would obviously be preferable. Or it might be possible to obtain the support of a private Member having the necessary facilities for it to be reintroduced in another place. Again, whilst he fully appreciated that this was not the occasion on which to discuss points of detail, it might well be that their Lordships had some important points to make and valuable suggestions of a general nature to raise. In the light of such comment it might well be possible to amend the Bill in various details before it was reintroduced, either in that House or in another place. This would undoubtedly expedite its progress. For these reasons, all concerned felt that a most useful purpose would be served by giving the Bill a Second Reading that afternoon.

" Before proceeding to outline the main object of the Bill " (Lord Stamp continued) " I should like to emphasise that it is not concerned with euthanasia or the slaughter of animals, which might well be the subject of separate legislation now that the Northumberland Report, dealing with the slaughter of horses, has been published. Nor, of course, does it deal with scientific experiments on animals, which are subject to the provisions of the Cruelty to Animals Act, 1876. The main object of this Bill is to bring the law up to date so far as it concerns the use of anaesthesia in connection with operations on animals. Since the passage of the Animals (Anaesthetics) Act of 1919, there have been a number of important advances in the development and range of anaesthetic agents which can be applied to animals. Moreover, there have been equally numerous developments as regards new operations and the invention of new techniques for applying anaesthesia. Furthermore, in 1948, a new Veterinary Surgeons Act was placed on the Statute Book, which placed additional restrictions on veterinary surgery by unqualified persons. In the light of these considerations, the veterinary profession has felt for some time past that an amendment of the law relating to the use of anaesthesia for animals was long overdue. As the Government of the day appear to have found some difficulty in finding the necessary time to introduce the required amending legislation the profession itself has taken the initiative in having a Bill drafted to achieve such amendment of the law as they consider necessary. This is the Bill which I submit to your Lordships this afternoon.

" As a medical man I do not claim to be an expert or authority on veterinary matters, but I am assured that the Bill which I have introduced into your Lordships' House has the complete support of the veterinary profession and of a number of organisations which are concerned with the matters with which it deals. For instance, the draft of the Bill itself was prepared by the British Veterinary Association, which, in the veterinary field, is the equivalent of the British Medical Association. It has also the support of the Scottish Branch of the British Veterinary Association, the Royal College of Veterinary Surgeons, and the Animal Health Trust. The National Farmers' Union, the National Cattle Breeders' Association, the British Horse Society and the Kennel Club all give it full and strong support. I am further informed that the R.S.P.C.A., in principle, are glad to support the Bill. The P.D.S.A. has expressed a similar view. It may well be that other organisations concerned may equally be recorded as supporters of the measure, but in view of the fact that it was printed only at the end of July there has not yet been time for all concerned to express themselves on the subject. It is, however, encouraging to note that up to date the British Veterinary Association, who have taken a leading part in the matter, have not been informed of any opposition."

Returning to the Bill itself, he would emphasise that whereas the Animals (Anaesthetics) Act, 1919—which by Clause 4 of his Bill they sought to repeal—applied only to a limited class of animal, namely, horses, bovines, dogs and cats, this amending Bill would apply to all animals, but not to birds, fowls, fishes and reptiles. These had been left out because he was informed there was as yet no anaesthetic development which was satisfactory for use in operations applying to them. It was, of course, conceivable that this position might change as years went by, and for that reason it might be possible to consider adding to the Bill at some later stage an amendment giving the Minister power, after suitable consultations, to bring some of this category within the Bill if he should think fit.

" Furthermore," proceeded Lord Stamp, " the Animals (Anaesthetics) Act, 1919, as well as being concerned with only a limited range of animals, was concerned only with a limited number of operations upon them. Set out in six schedules to that Act are three lists of specific operations—on horses, dogs and cats, and bovines respectively—for which a general anaesthetic is obligatory, and a further three lists for those classes of animals for which a local anaesthetic is obligatory. The veterinary surgeons are satisfied that those lists have become completely out of date. Some of the operations for which general anaesthesia is obligatory could be far more humanely performed, if indeed they have to be performed at all, with the use of an up-to-date local anaesthetic.

" There are, moreover, numerous absurd anomalies arising under the 1919 Act. I should like to quote one or two examples. First, the 1919 Act lays down that the operation for the removal of the ovary in a bovine must be carried out under general anaesthesia. The facts are, however, that under modern conditions ovariotomy is far more safely and efficiently performed, with the animal fully conscious and standing, under spinal anaesthesia. Again, the operation of stripping the wall and sole from the claw or hoof of any animal may be carried out with any anaesthetic, except for the horse, where a general anaesthetic is scheduled—and this in spite of the fact that the local anaesthetic known as nerve block anaesthesia is more easily, more frequently and more efficiently effected on this animal than on any other. Thirdly, operations for extensive tumours are included in the case of the horse but are not mentioned in the case of the dog, the species in which such operations are most often performed. The Act provides for such rare operations as quittor in the horse and enucleation of the eyeball, yet many common operations are not included, even though in some cases they require complicated anaesthesia—for example, reducing of fractures and dislocations, opening of joints, pinning and screwing of bones, amputations,

operations on chest, lungs, heart or brain, and so on. The Act protects the horse for certain dental operations, such as the removal of a molar tooth, even in an old horse where the tooth is falling out, but no reference is made to tooth extraction in the dog, the species in which dental disease is most common and in which dental extraction is often necessary."

It was true that machinery was provided in Section 3 of the 1919 Act for modifying and extending the Schedules, but modifications on the scale required to-day were considered to be quite impracticable. Nor would they remain up to date for long, as knowledge of animal anaesthesia was continuously progressing and new operations were being developed. "The veterinary profession take the view that it is now quite impossible to lay down in scheduled lists the kind of anaesthetic to be used for different kinds of operations. This must be left to the veterinary surgeon, since he is the only one capable of assessing all the requirements. The Bill which I have introduced therefore makes it possible, and indeed obligatory, for the veterinary surgeon, in all operations involving pain, to use whatever anaesthetic he considers most suitable."

So far as machinery was concerned, the Bill proposed to make use of the enforcement machinery of the Protection of Animals Act, 1911, and to lay down that if henceforward anyone performed an operation on an animal without using an efficient general or local anaesthetic, so as to prevent the animal from feeling pain throughout the operation, it should be deemed to be an operation which was performed without due care and humanity within the meaning of the Protection of Animals Act, 1911. He would thus become liable under that Act to the same penalties which applied to a breach of the Animals (Anaesthetics) Act, namely, a maximum of £25 and imprisonment not exceeding three months.

Clause 2 defined the type of operations to which the Bill was to apply, *i.e.*,

"any operation with or without the use of instruments which involves any surgical interference with the sensitive tissues or the bone structure of an animal. . . ."

It was, however, necessary to exclude certain minor operations for which it was not usual to use an anaesthetic and in which the pain involved was so comparatively limited, or so quickly over, that it would be impracticable to insist on the use of an anaesthetic. These minor operations were set out in a Schedule and included such operations as the docking of dogs' tails before their eyes are open, and also operations which might be necessary in an emergency to save life or relieve pain. It might, however, be necessary as time went on to make certain modifications in this Schedule in the light of experience, or in the light of new experiments with anaesthesia. In Clause 3, therefore, power was given to the Minister of Agriculture, after consulting the interests concerned, to make alterations in the Schedule, after seeking the approval of Parliament. It would be observed that in its present form the Bill did not apply to Scotland or Northern Ireland. He was informed, however, that since the Bill was introduced the Scottish interests had made it clear that Scotland should be included, and as this could be achieved without much difficulty by the introduction of certain Amendments, he could give an assurance that, if the Bill made any further progress through Parliament, steps would be taken to introduce the necessary Amendments for that purpose.

"So much for the detail of the Bill," Lord Stamp concluded. "With regard to its principles, I would emphasise once again that its main object is to ensure that the advances in scientific knowledge in the field of animal anaesthesia are applied in practice without legal hindrance. The veterinary profession are convinced that the time has now come when all painful surgical operations on animals should be carried out under conditions which will reduce the pain to the absolute minimum possible. My Lords, I trust that I have said enough to indicate why the Bill is considered so necessary. I also hope that ways and means will be found to bring it speedily to the Statute Book, and that this afternoon's debate will materially contribute to that end. I beg to move that this Bill be now read a second time."

Lord Haden-Guest, supporting the motion that the Bill be read a second time, said it seemed to him that while in the medical profession—to which he also had the honour to belong—they had their anaesthesia up to date, in the veterinary profession they had not. "They are lagging behind now. They are governed by an Act of 1919, which is a very long time ago, particularly in a world which is affected to a large extent by scientific discoveries. In fact, since 1919 there have been revolutionary discoveries in regard to modern medicine, and that applies equally to the veterinary sciences. The changes that have taken place since 1919 in the application of knowledge to medicines for human consumption and to anaesthetics for human use have been revolutionary. Changes have also been revolutionary with regard to animals, and it is quite clear from what the noble Lord has said that the present regulations governing the veterinary profession are out of date. What, in fact, this Bill proposes to do is to bring matters up to date." Might he say (and he hoped the noble Lord would agree with him) that it was quite clear that nothing in this Bill affected vivisection—he understood from the noble Lord's gesture that that was so. Vivisection was governed by other laws and not by that Bill at all, so he did not think that aspect of the matter need bother their Lordships in any way.

There had been a great deal of support, and no opposition, from all sections concerned with veterinary work, and from farmers and all those who knew about the day-to-day details of work with animals. That showed clearly that the world which was mostly concerned with animal life was satisfied that this was a necessary reform. "Under the present law it may be essential to use a general anaesthetic for a particular operation when, in fact, a local anaesthetic is much better and causes less trouble." It might be that there were a number of points of that kind. The Bill should receive its Second Reading that day: it was highly desirable that it should go through. He knew it was the usual custom, when Private Members' Bills were moved in that House, for opinions to be aired and the matter concerned to be discussed. But that did not necessarily mean that the Bill would come on to the Statute Book. "For myself, I do not see any reason why a Bill of this kind, which has no political repercussions at all, should not receive its Second Reading and go forward. It is quite clear, for another reason, that this particular Bill will not be treated in that way, because the Session is coming to an end in two days' time. Apart from that, however, a Bill of this kind, initiated in this House, should be able to be passed through the other place, because this Bill deals with a matter which is of great scientific interest and of humanitarian and, in fact, general importance. There is practically no body of opinion of any kind against it. Therefore, I strongly support the noble Lord, Lord Stamp, and I hope the Bill will receive a Second Reading this afternoon."

Lord Amulree, also supporting, said the Bill had two great advantages: in the first place, it was extremely short, and, secondly, it was a comprehensive Bill. He entirely agreed that there was no point in extending the Schedule of the 1919 Act, because, with the changes in practice which occurred from time to time, it was difficult to carry forward such a Schedule.

"The real point of the present Bill is that it places firmly upon veterinary surgeons the responsibility of seeing that they carry out their surgical work in the most humane, sensible and reasonable way possible; in other words, it makes their work approach that of the members of the profession to which I belong, in which one does not have to do one's work by rule of thumb laid down in a Schedule. It is for that purpose that I trust your Lordships will give this Bill a Second Reading, and in that connection I support every word that my noble friend has said."

Lord Amwell observed that it was a welcome feature of the presentation of the Bill that not only the veterinary profession but every kind of organisation interested in animal welfare was behind it. Therefore, on behalf of all sections of animal welfare, as distinct from professional veterinary interests, he cordially supported the Bill.

Lord Dowding requested enlightenment in one particular respect. He was a little apprehensive about paragraph 3 of the Schedule which concerned the castration of any male or female domestic animal before it had reached the prescribed age. He did not know what the definition of a domestic animal was. For instance, he did not know whether a horse was a domestic animal. But the law as regarded the castration of horses had, he thought, been lamentably defective up to date. If he was right in his recollection, the castration of horses up to the age of two years could be performed by an unqualified person. He thought there was no provision that even after two years an anaesthetic must be applied when this very agonising operation was carried out. So he would like to be assured that not only in the case of horses but in the cases of all other animals when there was a question of castration, their interests should be fully and adequately safeguarded. In other respects he fully endorsed the Bill, which had his most cordial support.

Government Reply

The Joint Parliamentary Secretary, Ministry of Agriculture and Fisheries (Lord Carrington): "My Lords, I am sure that we are all interested in, and would wish to support, any measure which has as its object the prevention of pain and suffering among animals, and I should like to say at once that Her Majesty's Government have every sympathy with the motives of the noble Lord, Lord Stamp, in introducing this Bill. I have listened, as I am sure all your Lordships have done, with great interest to what he has said. I think he has given the House a very clear picture of what may be, and often is, involved in operations on animals.

"I do not think there is very much that I need say, except that the Government support the Bill in principle. Perhaps I should also say that, short though it is, I believe some details of the Bill will need further study. In particular, I have in mind the provision in paragraph 3 of the Schedule to which the noble and gallant Lord, Lord Dowding, has already drawn your Lordships' attention. The effect of this provision is that my right honourable friend the Minister of Agriculture and Fisheries may, after consultation, make regulations for prescribing the maximum age at which, exceptionally, an animal may be castrated without the use of an anaesthetic. This is a question which might conceivably prove to be rather controversial, and as my right honourable friend's Departmental responsibility in this matter rarely goes beyond the farm, I think it would be better if the Bill itself were to specify the exceptions rather than leave them to be dealt with by a regulation. I hope that the noble Lord, Lord Stamp, will agree that this particular point needs looking into rather carefully. As the noble Lord has said, there is no prospect of this Bill making any further progress this Session—there are only two more days left. I am afraid that I cannot give him any undertaking that Her Majesty's Government will be able to find time to take up the Bill themselves. All I can say at this juncture is that Her Majesty's Government support the Bill in principle."

The Earl of Listowel thought the course of the debate had shown that the different interests affected by the Bill, the veterinary interests and the animal welfare interests, and the agricultural interests which were represented by the Department for which Lord Carrington spoke, regarded this as a good Bill. "There has been absolute unanimity about the principle of the Bill. I think the fundamental consideration is that if it is wrong to cause unnecessary pain to animals then it is clearly right (and this is what the Bill proposes) that all operations involving pain, apart from certain classes of operation specified in the Bill, should be carried out under an anaesthetic." He had one question to ask about the Schedule. Obviously an intention was not enough, and he would like to know whether it was absolutely clear in the Schedule that any operations conducted by scientists for experimental purposes, where consciousness of the animal was essential, were excluded from the provisions of the Bill. He thought it was important that that point should be looked at, and that, if necessary, an alteration should be made at the Committee stage.

"Apart from that," Lord Listowel continued, "I have only one thing to add. It seems to me a pity that a Bill which has won such general approval should have no opportunity of passing into law. It will, clearly, be dropped at the end of this Session. May I address a request to the noble Lord, Lord Carrington—namely, that, during the course of the next Session, the Government should seriously examine the possibility of including in their legislative programme a Bill on these lines? I know how heavy a legislative programme is. I am not sure whether I ought to be addressing this request to the noble Lord opposite or whether I ought to be addressing it to the noble Viscount, Lord Woolton. However, I am sure that he will give sympathetic consideration to what I am saying. Whether this should be a request to the Ministry of Agriculture or to the Home Office, I am not clear. It is a little difficult, in matters of this kind, to define Departmental responsibility. However that may be, I should like to ask noble Lords opposite who represent the Government to give this matter their consideration. It would be a great pity if the Bill again failed in the next Session simply because it was a Private Members' Bill and there was not the Parliamentary time for it which would be required if it was to pass into law."

Lord Stamp felt that there was little that he need add to his previous remarks, except to thank all noble Lords who had supported the measure, and to assure them that any suggestions or comments they had made would receive the fullest consideration when Amendments to the Bill were being considered. With regard to the point raised by Lord Dowding, he could assure him that the interests of horses in regard to the matter of the age of castration would be fully safeguarded. He might emphasise once again—he mentioned this earlier—that the Bill did not apply to scientific experiments on animals, which were adequately safeguarded and covered by the provisions of the Cruelty to Animals Act, 1876. He saw no reason why a sentence or sentences emphasising that point should not be put into the Bill, if that was considered desirable. As several noble Lords had pointed out, this was a non-controversial measure, and it had evoked such widespread support and sympathy from so many groups of people, and was so obviously necessary, on humanitarian as well as on utilitarian grounds, that he could not conceive that it should be subjected to delay or should be shelved at any stage. He therefore greatly welcomed the general support given by Her Majesty's Government, though he must confess to some disappointment that they did not see their way to undertaking to sponsor the Bill's future progress. "But with their blessing I trust that a way will be found speedily to bring it into law."

The Bill was then read a second time and committed to a Committee of the whole House.

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QUESTIONS IN THE COMMONS

Slaughter of Horses (Committee's Recommendations)

Mr. Renton (October 26th) asked the Minister of Food what steps he proposes to take in view of the recommendations of the committee of enquiry appointed by him to enquire into the slaughter of horses.

Sir J. Crowder asked the Minister of Food what action he proposes to take to implement the recommendations of the committee of enquiry into the slaughter of horses.

Dr. Hill: I am not yet able to add to the reply given to my hon. Friend the Member for Ayr (Sir T. Moore) on October 20th.

Mr. Renton: Is my hon. Friend aware that since the committee were appointed the slaughter of horses has continued at an alarming rate? Will he ask his right hon. and gallant Friend to treat this as a matter of great urgency?

Dr. Hill: This matter is being treated as a matter of urgency and sympathetic consideration is being given to the recommendations.

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Slaughterhouses

Captain Duncan (October 26th) asked the Minister of Food whether the committee looking into the siting of slaughterhouses has yet reported; and what recommendations it has made.

The Parliamentary Secretary to the Ministry of Food (Dr. Charles Hill): No, Sir. The committee for England and Wales is still taking evidence from the national organisations concerned.

Captain Duncan: Is my hon. Friend aware that a policy of moderate concentration of modern slaughterhouses is essential before we can get a meat marketing policy? Is it not vitally necessary to hurry up the work of this committee and of the Scottish committee?

Dr. Hill: It is necessary, I agree, that this Report should be completed as soon as possible and the committee are aware of that. They are awaiting some representations from representative bodies who desire to give evidence.

Mr. T. Williams: Will the Minister consult the chairman of this committee and invite him to produce an interim report as quickly as he can?

Dr. Hill: I should like notice of that.

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Cattle (Warble Fly Dressing)

Mr. G. Williams (October 27th) asked the Minister of Agriculture if he is satisfied that the compulsory dressing of cattle against warble fly is being carried out.

Sir T. Dugdale: The enforcement of the Warble Fly Order, which requires the dressing of warble-infested cattle, is the responsibility of the police and local authorities. While I am satisfied that they are doing all they can to secure compliance with the Order, there is little doubt that there is fairly widespread failure to observe it, particularly as regards young stock at grass. The Order is difficult to enforce and I am considering the possibility of further measures designed to improve the situation.

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Milk-borne Diseases (Protection)

Dr. Broughton (October 27th) asked the Minister of Food what progress has been made in the specification of areas under the Food and Drugs (Milk, Dairies and Artificial Cream) Act, 1950, and the Milk (Special Designations) Act, 1949, for the purpose of protecting the public against milk-borne diseases.

Dr. Hill: Forty-eight per cent. of the population of England and Wales and 63 per cent. of the population of Scotland reside in areas specified by Orders which have been made or which are now laid, in draft, before Parliament. Surveys are proceeding with a view to specification of further areas.

Dr. Broughton: While thanking the hon. Gentleman for that information, and understanding that a good deal of the credit goes to the previous Government, may I ask him to let us know, if he can, the approximate date by which the public will be protected against the dangers of bovine tuberculosis by the whole nation's milk supply being either pasteurised or coming from tuberculin tested herds?

Dr. Hill: I sympathise with the hon. Gentleman's purpose, but it is impossible to forecast when the work of surveying the country will be completed.

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Food Poisoning

Dr. Stross (October 27th) asked the Minister of Health how many attacks of food poisoning have been notified during 1953,

to the nearest available date; and if he will tabulate the information so as to give the causal organism; the type of food that was contaminated; the numbers of people involved; and the place or institution in which the outbreak occurred.

Mr. Iain Macleod: The table below gives the number of outbreaks of food poisoning in England and Wales notified to me between January 1st and October 21st, 1953, by medical officers of health and the number of persons affected in them according to the causal organism, type of food and the place where the outbreak occurred.

	Outbreaks	Persons Affected
Causal Organism		
Salmonella group	117	2,302
Staphylococci group	61	2,118
Cl. welchii	11	461
Miscellaneous	14	134
Unknown	97	951
	300	5,966
Type of food		
Meat and meat products	109	2,605
Fish and fish products	12	75
Duck eggs	12	15
Milk and milk products	20	1,775
Miscellaneous	15	58
Vehicle of infection not established	132	1,438
	300	5,966
Place of outbreak		
Hotels, catering establishments, etc.	24	292
Schools	28	1,970
Factory canteens	17	467
Camps	2	181
Hospitals	16	405
Local authority institutions	3	319
At home	132	1,418
Other places	12	470
Unknown	66	444
	300	5,966

Myxomatosis (Advisory Committee)

Lieut.-Colonel Bromley-Davenport (October 29th) asked the Minister of Agriculture whether, in view of the outbreak in this country of myxomatosis amongst rabbits in certain areas, he can now state what is to be the policy of his Department in this connection.

Sir T. Dugdale: The Secretary of State for Scotland and I have set up a Committee to advise on the problems arising in connection with myxomatosis in rabbits and the action that should be taken by the Government. The Chairman of the Committee is Lord Carrington and the following have already accepted invitations to serve:—

Lord Merthyr, Dr. C. H. Andrewes, Mr. H. Collison, Dr. J. W. Evans, Professor R. E. Glover, Messrs. H. Gardner, J. Scott Henderson, Q.C., the Hon. Mrs. George Lane, Messrs. C. T. Plumb, J. N. Ritchie, W. H. Senior, Major R. Verney and Mr. Harold Woolley.

All reasonably practicable steps are being taken to stamp out the only two known outbreaks of the disease that have recently come to light in Kent. Measures are also being examined for the protective inoculation of tame rabbits in case myxomatosis should spread. Future policy will be determined in the light of recommendations from the new Advisory Committee which is holding its first meeting next week.

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"Gay Time" (Sale to Japan)

Mr. J. Morrison (October 29th) asked the Minister of Agriculture whether he will make a statement about the future of the stallion "Gay Time," which was purchased by the National Stud last year.

Sir T. Dugdale: "Gay Time" was bought by the National Stud for £50,000 in July, 1952, to stand at a moderate fee for the benefit of smaller breeders. He had won four races and was second to "Tulvar" in the Derby and in the King George VI and Queen Elizabeth Stakes. In the interests of the thoroughbred breed it was decided to test the horse on the racecourse in 1953 as a four-year-old. Although he won his first race, "Gay Time" subsequently developed an ailment and it has been decided that he is not suitable to be kept as a stallion at the National Stud. "Gay Time" has now been sold to the Government of Japan, the amount realised being £15,000. Breeders who subscribed for nominations have been released from their obligations.

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Animals (Jewish Slaughter)

Mr. Peter Freeman (October 29th) asked the Minister of Food how many animals of each variety were killed by the Jewish method of ritual slaughter last year; and, in view of the greater cruelty so caused, what steps are being taken to abolish this method.

Major Lloyd George: In 1952 73,000 cattle, 34,000 calves and 93,000 sheep and lambs were slaughtered by the Jewish method.

As regards the second part of the question, without necessarily accepting the implication contained in it, I would point out that the abolition of this method of slaughter would deprive orthodox Jews of meat.

NOTES AND NEWS

Diary of Events

Nov. 7th.—Meeting of the Scottish Metropolitan Division, B.V.A., in the Royal (Dick) School of Veterinary Studies, Edinburgh, 2.30 p.m.

Nov. 14th.—Meeting of the Biochemical Society, St. Mary's Hospital Medical School, 11.30 a.m.

Nov. 17th.—Meeting of the Herts and Beds Division, B.V.A., at Luton (The George Hotel), 7.30 p.m.

Nov. 18th.—Meeting of the South-Eastern Division, B.V.A., at Maidstone (Royal Star Hotel), 2.30 p.m.

Nov. 18th.—Royal Microscopical Society: First Scourfield Memorial Lecture: Professor F. W. Jane "The Frontiers of the Plant and Animal Kingdoms," Tavistock House, W.C.1, 5.30 p.m.

Nov. 19th.—Research Defence Society's Stephen Paget Memorial Lecture, University College, Gower Street, W.C.1, 5.30 p.m. (Professor Sir James Learmonth: "The Surgeon's Debt to Animal Experiment.")

Nov. 27th.—Meeting of the Royal Counties Division, B.V.A., at Reading (Caversham Bridge Hotel), 2.30 p.m. (Notice follows.)

Dec. 4th.—Annual Dinner and Dance of the North Wales Division at Llandudno (St. George's Hotel), 7 p.m. for 7.30 p.m.

R.C.V.S. Membership Examinations

Nov. 9th.—Pharmacology, etc. (Revised Syllabus), Oral and Practicals (London and Dublin).

Nov. 9th.—Animal Management Examination commences at Edinburgh.

Nov. 11th.—Meeting of the Association of Veterinary Teachers and Research Workers (Scottish Regional Group), in burgh, 2 p.m.

Dec. 10th.—M.R.C.V.S. Written Examinations.

Dec. 11th.—M.R.C.V.S. Written Examinations.

Dec. 14th.—M.R.C.V.S. Oral and Practicals commence (Panels "A" and "B").

B.V.A. Council and Committee Meetings

The following are the arrangements for the next meetings, which will be held in London on Wednesday, Thursday and Friday, November 11th, 12th and 13th, 1953:—

Wednesday, November 11th

12.0 noon. Parliamentary and Public Relations Committee.
2.0 p.m. Veterinary State Medicine Committee.
2.30 p.m. Editorial Committee.

Thursday, November 12th

10.0 a.m. Organising Committee.
12.0 noon. Home Appointments Committee.
2.0 p.m. Finance Sub-committee.
2.30 p.m. General Purposes and Finance Committee.

Friday, November 13th

11.0 a.m. Council Meeting.

Thursday, November 26th

11.0 a.m. Meeting of Sub-committee *re* Calf Husbandry and Diseases.

Friday, November 27th

10.30 a.m. Meeting of Technical Development Committee.

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PERSONAL

Appointments.—The following appointments in the Colonial Veterinary Service are announced: Messrs. K. S. Hedger, M.R.C.V.S., as Veterinary Officer, Kenya; A. O. Merry, M.R.C.V.S., as Veterinary Officer, Sarawak, and E. D. Wright, M.R.C.V.S., as Veterinary Officer, Nigeria.

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Births.—Fleming.—On October 29th, 1953, to Judith Ann (*née* Long) and Alian Fleming, Saffron Walden, Essex, a son. Both well.

Harris.—On October 25th, 1953, at Ibadan, Nigeria, to Catherine, wife of G. D. Harris, M.R.C.V.S., a son—Alan Douglas.

Orton.—On October 27th, 1953, at Clifton Park Road, Fordingbridge, to Joan, wife of R. G. Orton, M.R.C.V.S., a daughter —Elaine Jacqueline; sister for Christopher.

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Forthcoming Marriages.—Laing—Sumner.—The engagement is announced between Peter William, only son of Mr. and Mrs. W. M. Laing, of B.A.O.R., Germany, and Kathleen Mary, elder daughter of Dr. and Mrs. W. L. Sumner, of Chilwell, Nottingham.

Ormiston—Fleming.—The engagement is announced between Thomas T. Ormiston, M.R.C.V.S., 21, Bridgend, Duns, and Helen E. Fleming, M.R.C.V.S., 12, Mayfield Road, Sutton, Surrey.

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A Canine Society Appeal.—Mr. Alex. McGuinness, M.R.C.V.S., of Minehead, who enlisted the aid of local practitioners in a draw in support of the funds of the Minehead and District Canine Society, writes: "Apropos my appeal to fellow veterinarians in this area on behalf of our local canine society, may I be permitted through your columns to extend my sincere thanks to those who assisted in my little scheme. I would also extend my apologies to any who found my approach to be in any way irksome or inconvenient. The prize of a week-end holiday has been awarded to B. Stafford, 39, Queen's Road, Blandford, Dorset."

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Presentation to Mr. Henry Taylor, F.R.C.V.S.—There was a very pleasing incident—a presentation to Mr. Henry Taylor, a former churchwarden at St. Wilfrid's Church, Haywards Heath, who recently retired from office on completion of 40 years' service—at St. Wilfrid's Parochial Church "social" held at the Sussex Hall, Haywards Heath, on October 14th. In an interval the Vicar, the Rev. H. H. Tarrant, said that members of the congregation had been requested to contribute a maximum token of 2s. 6d. towards securing a suitably worded illuminated address. Mr. Richard Chandler had kindly acted as Hon. Treasurer. The Vicar then handed to Mr. Taylor a book which will contain the names of 130 subscribers as well as a cheque as a tangible expression of esteem and regard. The illuminated address will follow in due course.

In returning his heartfelt thanks, Mr. Taylor recalled that he had served under five vicars—the Rev. T. G. Wyatt, the Rev. E. Cresswell Gee, the Rev. J. A. W. Bell, the Rev. H. A. Thomas and the present Vicar. The speaker commented on each Vicar's achievements, and related various interesting incidents in connection with St. Wilfrid's Church. Mr. Taylor paid tribute to his colleague, Mr. Richard Chandler, and added that they had been "a happy family at St. Wilfrid's." He sincerely trusted that the work of the Church might be maintained and developed. (Applause.)

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FOOT-AND-MOUTH DISEASE AT WORCESTER

On October 29th, foot-and-mouth disease was confirmed among cattle at Worcester.

An area extending for approximately 15 miles around the infected premises has been declared to be an infected area.

Animals may not be moved in the area without a licence and the holding of markets within the area is restricted.

CONTROL OF LIVESTOCK DISEASES IN BRITAIN

On Wednesday, October 21st, Professor T. J. Bosworth gave his presidential address to the Section of Comparative Medicine of the Royal Society of Medicine. His subject was "Control of Livestock Diseases in Britain. Some Reflections on the Present Situation." Professor Bosworth referred to the formation of the Section of Comparative Medicine some 30 years before and traced the very great progress in control of livestock diseases which had occurred since then. He discussed in detail the measures that had been taken to control all the principal livestock diseases. Referring to foot-and-mouth disease he remarked that the great epizootic of two or three years ago had been completely stamped out by application of the slaughter policy. He also made reference to the great public outcry which always arose during foot-and-mouth epizootics and to the work of the committee which had been set up to enquire into the official policy on the control of this disease. Professor Bosworth said he would be very surprised if that committee reached any conclusion other than that the slaughter policy should be continued.

In his concluding remarks, Professor Bosworth referred to the enormous cost of animal disease and stressed the need for more money to be made available for research. The control of veterinary research through an Agricultural Research Council was not satisfactory in his view, and he hoped that control in the future would be exercised by a Veterinary Research Council which had not got responsibilities in other fields in agriculture.

H. E. H.

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PRINCESS MARGARET TO ATTEND CIRCUS PERFORMANCE IN AID OF THE ANIMAL HEALTH TRUST

At a Press cocktail party held at the headquarters of the Rank Organisation in South Street, on October 28th, it was announced that the Princess Margaret has consented to attend a gala performance of the Tom Arnold Circus in aid of the Animal Health Trust. The performance takes place on December 21st. A brilliant cast of circus artists drawn from all over Europe will present a splendid show and members of the profession who wish to take their children will not only give them a great treat but will be supporting a professional organisation into the bargain.

The Trust is most grateful to Mr. Tom Arnold and to Mr. Frank Gentle and the Directors of Harringay Arena for their generosity in giving the proceeds of this gala performance for the Trust's funds.

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LEGAL NOTES

Breach of Importation Order

At the West Ham Magistrates' Court, before J. P. Eddy, Esq., Q.C., on Monday, November 2nd, 1953, M. Jacques Ruyssen, master of the s.s. *Mont-Viso*, was fined £10 for bringing into the Victoria Dock a live pig contrary to the Animals (Importation) Order of 1930 and the Diseases of Animals Act, 1950.

Mr. H. E. Bywater, prosecuting on behalf of the West Ham County Borough Council, stated that when the vessel was boarded by a Customs official, the captain declared that he had on board a live pig, which had been purchased by members of the crew in Yucaro, Cuba—a prohibited country. The Animals (Importation) Order was introduced to limit the risk of the introduction of certain infectious diseases of animals such as foot-and-mouth disease. In countries where such diseases were common, animals might be capable of spreading infection yet not show very marked signs of disease. The risk was not so much from the presence of the animal itself but from the infective material passed out by the animal—to contaminate its surroundings—and which might be carried ashore by people on their boots, clothes and hands. It was unnecessary to stress the trouble and expense which an outbreak of such a disease as foot-and-mouth might cause in this country. He did not suggest that the master had deliberately broken the law, rather was his offence due to neglect or ignorance and he must state that the master, when advised of the circumstances, immediately consented to have the pig killed and consumed on board.

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DAIRY SHOW CHAMPION

The supreme individual championship at the Dairy Show, Olympia, was won by Smallburgh Brenda, a British Friesian cow exhibited by Smallburgh Farms, Ltd., of Smallburgh, near Norwich. The selection, made from a group in which nine breeds were represented, crowned a long list of successes achieved by the type during the show.

The animal, which is six years old, had previously gained the award for the greatest number of points recorded in the milking trials, and the breed distinction made on assessment by inspection and yield. The reserve placing was of Cleatlam Nellie 22nd, a Dairy Shorthorn shown by Sir John Armytage, of Brighouse, Yorkshire.

Animals of six breeds competed for the British Dairy Farmers' Association's cup for the breed society having the best exhibit of six cows, judged by inspection after qualification in milking trials. It was awarded to the Ayrshire competitors, and British Friesians were selected as reserves.

Mr. K. Stuart, M.R.C.V.S., of Haywards Heath, writes:—

"It may be of interest to report that the winner of the Buckhurst cup* (for milk and butter-fat for three successive lactations and inspections) at this year's London Dairy Show was operated on for traumatic reticulitis in February, 1950. The technique used involved the suturing of the rumen to the parietal peritoneum using nylon, and it would seem that the permanent anchoring of the rumen to the abdominal wall could have had little adverse effect in this case. Incidentally this cow was runner up for this cup in 1951 but was unable to compete in 1952 owing to foot-and-mouth restrictions."

* Mr. C. S. Haslam's Jersey, Moles Postman's Claucena.

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DAIRY HERD MANAGEMENT

The film show and brains trust on dairy herd management and good cowmanship which the Cambridgeshire Agricultural Executive Committee held at Newmarket on October 20th was probably typical of many similar meetings which will be held up and down the country during the coming winter season.

The film "Good Cowmanship" was made for Messrs. B.O.C.M. Ltd. at the Royal Agricultural College, Cirencester, and is concerned solely with the methods advocated by Professor Boutflour and exemplified in his management of the college dairy herd. As is well known, Professor Boutflour advocates the practice of "steaming up," accompanied, if necessary, by pre-milking.

The brains trust answered a variety of questions on different aspects of milk production, some of which were of direct veterinary interest. One would like to stress the value of the wider outlook and experience which veterinary participation can bring to meetings of this type. E. A. G.

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MYXOMATOSIS IN WILD RABBITS

The Ministry of Agriculture announces that myxomatosis has been found among wild rabbits in a woodland area of about 100 acres near Robertsbridge in Sussex. Rabbit-proof fencing has been erected round the area and steps are being taken to exterminate the rabbits within it.

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NATIONAL DOG SHOW

At the National Dog Show at Bingley Hall, Birmingham, last week there was an entry of 4,588, made up by 2,556 dogs of 95 different breeds. Gun dogs, hounds and toy dogs were on view on the first day, and terriers and the non-sporting breeds competed on Saturday.

On Friday, a three-year-old Pekinese dog, Don Wong-Ti of the Dell, owned by Mr. S. Lowe, of Hollywood, near Birmingham, won his third and qualifying challenge certificate so he is now a champion. He was also made best of breed and best dog in show for that day. On Saturday, Lord Northesk, who judged the final best in show competition, awarded him the supreme award of best in show of all breeds.

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ADDRESSES OF DISEASE-INFECTED PREMISES

The list given below indicates, first, the county in which are situated the premises on which disease has been confirmed, followed by the postal address and date of outbreak.

ANTHRAX:

Aberdeen.—Harthill Farm, Oyne (Oct. 29).

Kirkcudbright.—Burnside Farm, Lochfoot Road, Crocketford (Oct. 28).

Norfolk.—Whitewell Hall, Nr. Reepham, Norwich (Oct. 28).

FOOT-AND-MOUTH DISEASE:

Worcs.—Mill Bank, Oldbury Road, Worcester (Oct. 29).

FOWL PEST:

Norfolk.—Red Croft, Mattishal Road, East Dereham; Turnpike Farm, Horsford, and Corner Lane Premises, Horsford, Norwich; Mulberry Farm, East Dereham; Fairview, Corner Lane; 1, Little Lane, and Allotments at Corner Lane, Horsford, Norwich (Oct. 29).

SWINE FEVER:

Beds.—13, Dunstable Road, Toddington; The Rock, Luton Road, Toddington (Oct. 28).

Berks.—Mill Farm, East Challow, Wantage (Oct. 28).

Bucks.—Bury Farm, Astwood, Newport Pagnell (Oct. 31).

Cambs.—Feversham Road, Orchard, Fulbourn (Oct. 28); Lordship Farm, Elsworth (Oct. 29).

Ches.—Sunnymead Farm, Woodford, Stockport; Dryhurst Farm, Hollinwood Road, Disley, Stockport; Botterley Hill, Foddiley, Nantwich (Oct. 28); The Limes, Shavington, Crewe; 5, Smallholding, Highfield Estates, Levenshulme, Manchester (Oct. 29); Moor Hall Farm, Aston, Nantwich (Oct. 30).

Cornwall.—Treveigan Farm, Wadebridge (Oct. 29).

Denbigh.—Rodens Hall, Bowling Bank, Wrexham (Oct. 28).

Devon.—Berryhead Farm, Brixham (Oct. 31).

Essex.—Belmont Allotments, Castle Road, Grays (Oct. 28); Allotments, Back Lane, Canewdon; Belmont Allotments, Castle Road, Grays (Oct. 29).

Hunts.—Conquest Villa, Farcet Fen, Farcet, Peterborough (Oct. 28).

Kent.—Clockhouse Farm, Challock, Ashford (Oct. 29).

Leics.—Shackerston Fields Farm, Shackerston, Nr. Nuneaton (Oct. 28).

Lincs.—West End Road, Wyberton, Boston; Poplars Farm, Holland Fen, Lincoln; Vine Lodge, Butterwick, Boston (Oct. 28).

Norfolk.—Foxtail Covert Farm, West Tofts, Thetford (Oct. 30); Cobholm Garage, Mill Road, Gt. Yarmouth (Oct. 31).

Suffolk.—Broad Green Farm, Chevington, Bury St. Edmunds (Oct. 31).

Surrey.—Brinscombe Allotments, Godalming; 22, High Street, Caterham-on-the-Hill, Caterham (Oct. 28); Gunter's Wood, Hambledon, Godalming (Oct. 31).

Sussex.—Willow Farm, Herstmonceux, Hailsham (Oct. 28).

Yorks.—Belle Vue Farm, Paddock, Huddersfield (Oct. 28).

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RESISTANCE OF INSECTS TO CHEMICALS

The Times correspondent reported from Rome on November 1st: "Much was heard of the reported failure of DDT to fulfil its early promise as an exterminator of insect pests during a meeting of authorities on insects and insecticides organised by the World Health Organisation which ended yesterday.

"Professor P. A. Buxton, of the London School of Hygiene and Tropical Medicine, who led the British representatives and presided over the meeting, summing up the outlook for the future, said the solution of the problem of the resistance of disease-transmitting insects to insecticides was likely to come from 'a broad advance in insect physiology and biochemistry.'

"One conclusion reached by the meeting was that, with the exception of the housefly and possibly three or four species of mosquito, 'chemicals are now available that will control species which have shown resistance to DDT.' Lindane, it was stated, was being successfully used against DDT-resistant body lice in Korea. Bed bugs, which also appeared to be developing resistance, could be most effectively attacked with Lindane, and fairly effectively with Dieldrin. Dog fleas and cat fleas were becoming resistant to DDT, but 'good control out of doors has been obtained with Malathon.'"

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TREATMENT OF ANIMALS IN STOCK MARKETS

The council of the National Sheep Breeders' Association, meeting at Scarborough, decided by 16 votes to 13 to promote a private member's Bill dealing with cruelty to animals in stock markets. Sir William Prince-Smith, the President, said that in many cases auctioneers employed "any Tom, Dick or Harry" to beat the stock with heavy sticks. Much cruelty was involved, in addition to the deterioration caused to the meat.

Mr. George Wood, of Haselton, Gloucestershire, said that there were already adequate provisions on the matter.

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LIVESTOCK IN ENGLAND AND WALES

The September, 1953, agricultural returns for England and Wales indicate increases in total of all classes of livestock. As compared with September, 1952, the number of cattle (including

calves) increased by 228,000 (3 per cent.) to 7,856,000. Cows and heifers in milk increased by 138,000 (7 per cent.), but dry cows declined by 16,000 (2 per cent.) and heifers in calf by 47,000 (8 per cent.). Bulls and bull calves were lower by 4,000 (4 per cent.). Amongst "other cattle," the one-year-old and over classes increased by 126,000 (5 per cent.). Male animals under one year old increased by 45,000 (10 per cent.) but female animals declined by 13,000 (1 per cent.).

The total number of sheep and lambs increased by 456,000 (4 per cent.) to 12,692,000. Of the sheep one year old and over, which increased by 374,000 (5 per cent.), ewes for breeding increased by 224,000 (5 per cent.) and shearling ewes by 107,000 (9 per cent.). Sheep and lambs under one year old increased by 81,000 (2 per cent.).

The total of all pigs reached 4,458,000, an increase over the year of 355,000 (9 per cent.). Sows in pig increased by 26,000 (11 per cent.), gilts in pig by 31,000 (38 per cent.), and other sows kept for breeding by 33,000 (20 per cent.). Among the other classes of pigs, those five months old and over were 115,000 (10 per cent.) less than last year but pigs under five months increased by 375,000 (15 per cent.).

Total fowls were higher by 1,388,000 (3 per cent.), adult birds increasing by 1,255,000 (4 per cent.) and young birds by 133,000 (1 per cent.). Ducks and geese both showed declines but turkeys of all ages increased by 175,000 (16 per cent.).

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QUARANTINE REGULATIONS

In reply to a suggestion from a previous correspondent that the authorities should review the regulations requiring a dog to be placed in quarantine for as long a period as six months before entering this country, Mr. S. F. J. Hodgman, Director of the Animal Health Trust's Canine Research Station, writes as follows in a recent issue of *The Times*:—

"In his letter of October 28th Mr. M. G. Badger says, most properly, that the introduction of canine disease into this country cannot be permitted by the amendment of regulations at present in force. He then asks whether as long as six months is necessary to show whether a dog is infected or is a carrier. The answer is, emphatically, yes; six months is, in fact, a minimum period. Cases have been known within recent years when symptoms of rabies have not shown themselves until four, five or six months have been spent in quarantine. Indeed, a dog brought from Italy in 1947 developed symptoms as long as eight months after landing.

"No one likes the present long quarantine period, but until a completely effective immunising agent against rabies is found six months is vitally necessary if this most dangerous disease is to be kept out of these islands."

The Press Officer of the Ministry of Agriculture and Fisheries, Mr. A. D. Bird, continued the correspondence with the following:—

"In his letter of October 28th about the quarantine period for imported dogs Mr. M. G. Badger suggests that it should be possible to ascertain in a matter of weeks, rather than months, whether or not an animal is infected with rabies or is a carrier of the disease. Unfortunately, as Mr. Hodgman, of the Animal Health Trust, confirms in his letter of October 30th, this is far from being the case, because in rabies the incubation period may be as long as six months and in exceptional cases even longer. No means exist whereby the presence of the infection of rabies in any animal can be detected in its incubative stages, and clinical symptoms are not apparent until a few days before death. An animal affected with the disease may be capable of transmitting it to other animals or human beings before showing definite diagnostic symptoms.

"During the last 25 years 23 dogs have died from rabies in quarantine stations in this country, and seven of them died after having been in quarantine for four months or more. In three instances dogs died after having been in quarantine for over six months. Fortunately, though fortuitously, these animals had been left in quarantine by their owners when the symptoms first appeared. With regard to the suggestion that there should be some relaxation of the restrictions for dogs coming home from service stations in Europe, information reaching this Ministry shows that in the western zones of Germany there were 604 cases of rabies in 1951, 648 in 1952, and 525 up to mid-September of this year. The figures for the eastern zone are unknown, but are believed to be higher than those of the western zones.

"In the face of this evidence it would obviously be unsafe to reduce the quarantine period for rabies to one of less than six months."

SALE OF "SPECIALLY DESIGNATED" MILK IN SCOTLAND

The Milk (Special Designations) (Specified Areas) (Scotland) (No. 2) Order, 1953, is now laid in draft before Parliament for the requisite 40 days. This Order provides that from a date 15 days after the Order is made all milk sold by retail in the following areas shall be "specially designated" milk (that is, "pasteurised," "sterilised," "certified," or "tuberculin tested" milk or, until September 30th, 1954, "standard" milk)—the large burghs of Arbroath, Dumfries, Falkirk, Inverness, Kilmarnock, Perth and Stirling; the small burghs of Carnoustie, Crieff, Grangemouth, and Johnstone. On June 9th, 1953, the Minister of Food, Major the Right Hon. Gwilym Lloyd George, M.P., after consultation with the Secretary of State for Scotland, announced his intention, subject to any representations that might be made, of laying such an Order before Parliament. The Minister has now considered the representations made to him and has decided to proceed with the specification of the areas. The Order will not come into force before January 1st next.

CORRESPONDENCE

The views expressed in letters addressed to the Editor represent the personal opinions of the writer only and their publication does not imply endorsement by the B.V.A.

HAEMORRHAGIC SPLENIC CYST IN A DOG

Sir,—Mr. G. T. Wilkinson's description of a case of haemangioma of the spleen in a terrier prompts me to record the following similar case seen recently.

A six-year-old Dachshund dog was presented with a 24-hour history of anorexia, vomiting and listlessness. The temperature was 102·0 F. and a spherical mass was palpable in the mid-abdomen.

A tentative diagnosis of acute intestinal obstruction was made and laparotomy advised. This revealed a spherical tumour in the spleen and total splenectomy was carried out. Recovery was uneventful.

The tumour was situated on the parietal surface towards the ventral pole. There were omental adhesions to its surface resulting from small surface haemorrhages. Longitudinal section of the organ (Fig. 1) showed the interior of the tumour to have a reticulate structure and to be filled with blood. Histological examination indicated that the lesion was a haemorrhagic cyst probably derived from a haemangioma.

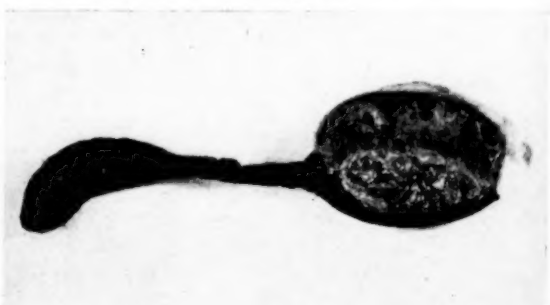

Fig. 1.

The symptoms in this case are difficult to explain as the cyst was obviously *not* of recent origin and was exercising no obvious pressure on the bowel.—Yours faithfully, T. G. Coward, Bridge House, Pilton Bridge, Barnstaple. *October 24th*, 1953.

R.C.V.S. ANNUAL FEES

Sir,—It is unfortunate that the letter of Mr. W. H. Parker on the above subject, printed in your issue of October 3rd, appears to have aroused so little interest among the members of the profession. It would be a pity if the Council of the R.C.V.S. took this as indicating that there is no disquiet among members regarding the enormous increase in the annual fee and the almost complete absence of any attempt to justify this increase.

Although the Report of Council, R.C.V.S. for the year ending March 31st, 1951, gives warning of a possible increase in the annual fee, the fourfold increase was first brought to the notice of the profession in the Report of the Council, R.C.V.S. for the

year ending March 31st, 1953. The only explanation for this fourfold increase is that the value of the pound has seriously depreciated since 1920 when the one guinea fee was instituted.

This somewhat inadequate explanation was elaborated by the President of the R.C.V.S. at the Annual General Meeting held in Edinburgh in May, 1953, only after a motion to raise the fee to two guineas had been put before the meeting. As no account of this meeting has yet been published, the profession at large may be interested to know that this motion was narrowly defeated.

The increase was justified on two main grounds:—

Firstly, under the Veterinary Surgeons Act of 1948 the responsibility for the conduct of membership examinations has been transferred to the universities. In consequence, that part of the income of the R.C.V.S. previously derived from examination fees had been reduced and would be still further reduced when the transfer was completed.

Secondly, the work of the College in the prevention of unqualified practice had resulted in greatly increased legal expenses.

We would suggest that the reduction of income from examination fees should be largely offset in the near future by the reduction of staff made possible with the ending of what must have been one of the main commitments of the Royal College.

The profession will be grateful to the R.C.V.S. for the zeal it has shown in ensuring that the provisions of the Veterinary Surgeons Act for the prevention of unqualified practice are carried out. We feel, however, that it is reasonable to suppose that the high legal expenses incurred in this way will rapidly diminish. This opinion is supported by the Report of the Council, R.C.V.S. for the year ending March 31st, 1953, which states on page 8 " The work of the Council in the prevention of unqualified practice has continued during the year, although not, however, at such pressure as before."

In our opinion the profession is entitled to a more adequate explanation than has yet been given of the necessity for a fourfold increase in the annual fee.—Yours faithfully, F. Alexander, I. S. Beattie, G. S. Ferguson, C. S. Grunsell and A. Marr, Edinburgh. *October 19th*, 1953.

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Sir,—Permit me to have the pleasure of congratulating Mr. J. Fox on his letter published in the current issue of *The Veterinary Record*.

When we were notified of the increase of the subscription I wondered whether such an increase was really justified, and if greater privileges were to accompany it. When one is informed that the Ms.R.C.V.S. of Eire have to subscribe only one guinea and it apparently carries with it the privilege of " introducing his bootmaker to our tailor " when ever he feels disposed, it leaves no doubt in one's mind that there should be a strict investigation by independent persons to put the matter on a fairer basis, or submit adequate measures to protect our rights.—Yours faithfully, Reg F. Wall, The Willows Bungalow, Maidenhead Road, Windsor. *October 27th*, 1953.

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MEAT INSPECTION SERVICES

Sir,—Your correspondent Mr. J. A. McPherson (*The Veterinary Record*, October 24th) will, I believe, stimulate protests from the veterinary profession. May I join the fray and say that, although I think his letter was motivated in this case by an imaginary slight on the status of the qualified meat inspector, I greatly admire the alacrity with which he jumped to the defence of his colleagues. His letter was symptomatic of the present feeling of many sanitary inspectors towards the veterinarian.

It is perfectly true that attacks have been made on the meat inspection services of this country, and many have been so ill-conceived and discourteous as to offend the dignity of any man. Sanitary inspectors are rightly jealous of their responsibilities for the public health and, within the framework of the present administration, do their unpleasant and financially unrewarding task with efficiency. Few who have associated with them for any length of time will dispute that.

The faults of the present meat inspection services are both technical and administrative and certainly experienced sanitary inspectors are as aware of them as anyone else. The losses to the country and the menaces to public health arise not from an inefficient performance of the individual inspector's duties but from the gross deficiencies in legislation and total lack of application of the principles of meat hygiene. Memo 3 Foods, for example, does violence to the intelligence of any public health worker. The lack of real authority to enforce the hygienic slaughtering, handling and transport of meat and meat products, the paucity of laboratory facilities to assist the meat inspector in his work—to make his authority more rational and therefore more effective; these are some of the real faults in the present system recognised by sanitary and veterinary authorities alike. It is to the great detriment of public health that they should so often be disguised by an excess of personal and professional pride, or by petty rivalries.

Veterinary science, together with sanitary science, is responsible for the safeguarding of human life against the hazards arising from the contact with diseased animals or from consumption of their products. Each has its contribution to make; the one in its more extensive knowledge of veterinary pathology and laboratory procedures, the other in the day-to-day administration and working of the meat inspection services. That is not to suggest, as is so often suggested, that the veterinarian who is specially trained in public health seeks absolute control of the activities of the experienced meat inspector; few of us covet that. Neither is it to suggest that, given the control, he would allocate the hard monotonous routine of meat inspection to the already experienced practical man.

A meat inspection service of a proper nature offers unique possibilities for the integration of the skill and knowledge of the trained scientist and that of his practical confrère. It is only by a combination of effort that a service of maximum efficiency may be given to the public. Let us think no more in terms of " fear of comparisons " between professions, but rather develop a willingness to co-operate and the courage to learn from each other.—Yours faithfully, J. M. Olivant, 35, Ince Avenue, Great Crosby, Liverpool, 23. *October 26th*, 1953.

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Sir,—In *The Veterinary Record* of October 24th Mr. J. A. McPherson's letter on the above subject prompts me to reply if only with one object, namely, to discourage argument on the question of responsibility for meat inspection.

For many years there has been a desire on the part of the sanitary inspector for equal status with the veterinary surgeon in matters such as meat inspection, and in fact with medical officers in some other public health matters.

No fair-minded person will criticise the desire for the advancement of the career of the sanitary inspector, provided their training, qualifications and experience are such that they can rightly claim it. There is, however, a tendency recently on their part to claim the whole of meat inspection as being entirely their sphere of work and to take umbrage if some members of the veterinary profession criticise a system of meat inspection where veterinary supervision is not provided for or ignored as necessary.

Having the highest regard for full-time meat inspectors, and experience in sharing difficulties together—for meat inspection is not all technical or theoretical knowledge—there is no question but that veterinary surgeons and sanitary inspectors can and do work in harmony, and the full-time meat inspector acknowledges the value and weight of veterinary opinion in many aspects connected with the slaughter and inspection of meat, not only in large abattoirs, but for maintenance of status, standards, cases where correct judgments have to be arrived at by laboratory technique, administration of the Diseases of Animals Acts and Orders or where treatments applied to food animals require liaison with the owner's veterinary surgeon for information and so on.

On the question of qualifications for meat inspection, these alone, without experience, are admittedly inadequate, but as an examiner of both veterinary and sanitary students in meat inspection—two or three examinations yearly for a mere 25 years on the Board of the Royal Sanitary Institute—there can be no argument with me that the veterinary student, in order to pass in this subject, must have acquired adequate knowledge of *ante-* and *post-mortem* inspection of food animals, advanced knowledge of bacteriology and pathology in relation to meat and meat products, preventive medicine, and so on, which would be unfair to ask and in any case is outside the syllabus of study required for the meat inspectors' certificate of the R.S.I. It must be borne in mind, however, that sanitary inspectors do not necessarily hold the certificate for the inspection of meat and other foods, although the Food and Drugs Act, 1938, empowers them to inspect meat.

In fairness, however, to the sanitary inspector, he becomes an executive officer of the Meat Inspection Service if he is found competent by veterinary examiners on the R.S.I. Board to recognise diseases and conditions affecting meat and to judge its fitness for human consumption and has a practical knowledge of disease processes, law relating to food and so on. This meat inspectors' certificate is recognised by Public Authorities as qualification for the work of meat inspection.

To my mind, it is highly prejudicial to the veterinary profession's interests to be indifferent to the claims that meat inspection is entirely within the scope of the sanitary inspector's duties, or to stand aside and lose the *post-mortem* room of the profession or training facilities for the medical, veterinary, and sanitary

student, in meat inspection by a veterinary surgeon specialising on this work, or be excluded from a service the profession has rendered in the past and is willing to render in the future to the benefit of both public and animal health as well as of the industries concerned in the production and marketing of meat.

Moreover, it is unsafe and undesirable that either the medical or the veterinary profession be denied the necessary executive or supervisory facilities they require, and there is no reason why the position should be any different in the case of meat as compared with milk so far as the public is concerned.

Why have the veterinary surgeon and the sanitary inspector to argue about something on which they can be complementary to one another in improving this service?

Statements such as " Whether this comparatively new interest in meat inspection " (quoting from Mr. McPherson's letter) astonish me, and I am sure he will not want me to go further into the history of meat inspection in this or other countries.—Yours faithfully, Wm. Tweed, Lynwood, Tarvin, Near Chester. *October 30th*, 1953.

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Sir,—In the issue of *The Veterinary Record* dated October 24th, 1953, I read in " Correspondence " a letter referring to the review of a report by Dr. Robinson, Director of the Abattoir and Live-stock Market Department, City of Johannesburg, in which the writer, Mr. J. A. McPherson, of Cheltenham, states that the reviewer made a mistake in referring to lay meat inspectors as " lay inspectors."

It seems to me that this distinction is correct because a sanitary inspector requires no academic qualifications, whereas a veterinary surgeon is the end-product of an intensive five-year course of study. This begins with such subjects as Osteology, and terminates with Surgery and Medicine (the latter including Meat Inspection, both being inseparable) the study of which requires a thorough knowledge of anatomy, physiology, hygiene, bacteriology, pathology and parasitology, etc.

The subject of Meat Inspection, it may be noted, is considered by the veterinary teaching authorities to be of such importance that it is not taught until the student has first completed four years of study, for then—and only then—is he fit completely to understand meat inspection.—Yours faithfully, G. M. Butler, " Maryfield," Carrabourn, Westport, Co. Mayo, Eire. *October 28th*, 1953.

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PROTECTION OF ANIMALS IN NORTH AFRICA

Sir,—May I say how very greatly I appreciate your kindness in inserting Major Hamilton Kirk's article in *The Veterinary Record*, thus drawing attention to the sufferings of animals in North Africa, and to the great need for further help for them. You will be glad to know that as a result of the article, a number of persons have sent contributions, which will be immediately applied to one or other of the various new projects which we have in hand, all urgently needed. Amongst these is the building of a Dog Refuge in Oran, to replace the present temporary one, a site having been granted by the municipal authorities. At Rabat and Meknes, in Morocco, we are in process of creating animal hospitals, mostly for equines which are neglected and which need treatment for harness sores and injuries. At Algiers we have a much larger project on hand, namely, the establishment of a complete Animal Refuge and Hospital for all kinds of animals, large and small, and including also a Humane Education Centre for teachers and their pupils, with a permanent exhibition of printed material (leaflets, posters, etc.) for schools. No work has been done in Algiers since the war, when our Clinic was closed down, and the town has since then presented special difficulties. However, we have now acquired an excellent site, and we have the full co-operation of the Public Health and Veterinary Services, as well as of the individual veterinary surgeons. Although Algiers is the capital, and a very beautiful modern town, it is full of half-wild starving cats (which breed unchecked) and many stray dogs; because their numbers are excessive, appalling and horrible cruelties take place.

We hope to have the Refuge and Hospital built and running before next summer, and it will fill a great need.

Your help thus comes at a very crucial moment, and we are deeply grateful for it.—Yours faithfully, N. Hosali, Organiser, Society for Protection of Animals in North Africa, 96, Blandford Street, London, W.1.

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XENOPHON AND VETERINARY HISTORY

Sir,—In reply to " Constant Reader's " letter on the above subject, I can assure him (or her) that Xenophon did write a series of essays on the horse. Some years ago I had the privilege of reading a privately circulated translation of this work and was amazed at the accuracy and detail of Xenophon's observations.

The work was primarily intended for cavalry officers and lays down rules to guide them in selecting, training, grooming and managing a horse in peace and on the battlefield. Much of the information given—for example, the need to avoid creating a " hard mouth " in a young horse—is as true to-day as it was in 400 B.C. All the training is devoted to producing a warhorse and it is stressed that no care is too great to lavish on the animal because it will be on its stamina, fearlessness and obedience that the life of the owner will eventually depend.

To me the highlight of the book was the very grave warning to the buyer to examine the horse in great detail because the seller was in all probability going to rob him of his money. Two thousand years seem to have wrought little change.—Yours faithfully, J. Deans Rankin. *October 31st*, 1953.

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Sir,—According to Huth's bibliography on Horses and Equitation published by Quaritch 1887, Xenophon was the author of two Treatises—" A Treatise on the Duties of a Commander of Cavalry " and " A Treatise on the Horse." These were first printed at Florence, folio 1516. The original date of these works is given as approximately 380 B.C. I hope these brief references may be of use to " Constant Reader."—Yours faithfully, N. Robert Turnbull, 65, Worting Road, Basingstoke, Hants. *October 30th*, 1953.

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Sir,—For information on the contribution of Xenophon to veterinary history I would refer " Constant Reader " (*V.R.* **65**, 44, p.778, Oct. 31st, 1953) to pages 8 and 9 of volume I of Sir Frederick Smith's Early History of Veterinary Literature, London: Baillière, Tindall & Cox, 1919. I would also bring to his notice that in this library we possess a volume of Xenophon's works dated 1596 which has a chapter " De Re Eqvestri " on pages 932-953, the text being in two columns, one Greek and one Latin.—Yours faithfully, M. M. Raymer, Librarian, Royal College of Veterinary Surgeons (Central Library for Animal Diseases), 9 and 10, Red Lion Square, London, W.C.1. *October 30th*, 1953.

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And " I. H." writes: " Xenophon's Anabasis and Memorabilia (Bohn's Classical Library) published 1872 gives a description of treatment to horses, but one must search diligently among its many pages.

" R. S. Timmis (Modern Horse Management (1920) chapter II, History of the Horse) states: ' Xenophon wrote his work about 350 B.C.,' but gives no authority for his statement.

" There were in Britain about 1872 two writers noted for their contributions regarding the Anabasis, one a military gentleman, and the other a member of the clergy; it is possible that the works of either of these may have been consulted.

" If ' Constant Reader ' lives near London why not consult the British Museum, or the R.C.V.S. Library ? "

DISEASES OF ANIMALS ACT, 1950—GREAT BRITAIN

Summary of Returns of Confirmed Outbreaks of Scheduled (Notifiable) Diseases

Period	Anthrax	Foot-and-mouth	Fowl Pest	Sheep Scab	Swine Fever
1st to 15th October, 1952 ...	14	—	16	—	62
Corresponding period in—1952	81	3	9	—	31
1951	13	—	9	—	112
1950	8	—	1	—	34
1st January to 15th October, 1953 ...	519	28	753	—	2,352
Corresponding period in—1952	738	494	180	1	723
1951	332	28	610	5	1,025
1950	285	20	103	21	210

Tuberculosis Order of 1938

The number of bovine animals slaughtered under the Tuberculosis Order of 1938 during the period July 1st to September 30th, 1953, was 492.